United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with the Illinois Agricultural Experiment Station

Soil Survey of Edgar County, Illinois

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How To Use This Soil Survey

General Soil Map

The general soil map, which is the color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

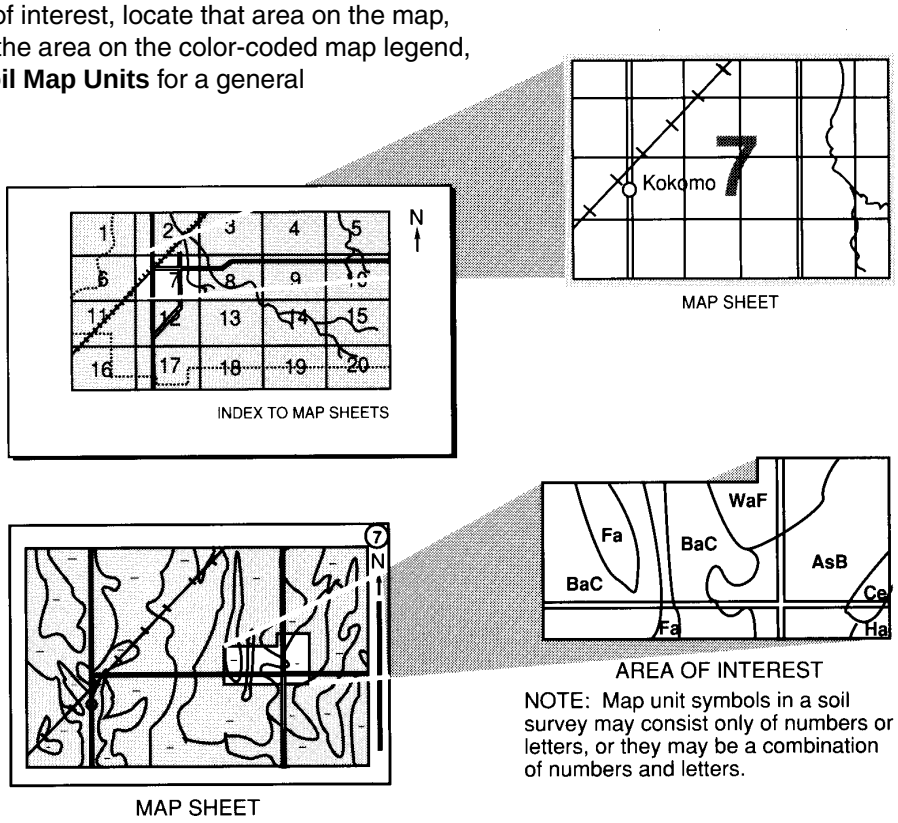
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets.** Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1991. Soil names and descriptions were approved in 1997. Statements in this publication refer to conditions in the survey area in 1991, except for statements regarding parts of sections 16, 17, 20, 21, and 28 of T. 14 N., R. 10 W. Mine spoil in this area was reclaimed following surface mining operations after 1991. This survey was made cooperatively by the Natural Resources Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Edgar County Soil and Water Conservation District. Financial assistance was provided by the Edgar County Board and the Illinois Department of Agriculture.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

This soil survey is Illinois Agricultural Experiment Station Soil Report 164.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov (click on "Technical Resources").

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Foreword

This soil survey contains information that affects land use planning in Edgar County, Illinois. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

William J. Gradle
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Soil Survey of
Edgar County, Illinois

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United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
the Illinois Agricultural Experiment Station

EDGAR COUNTY is in east-central Illinois (fig. 1). It is bounded by Vermilion County on the north, Indiana on the east, Clark County on the south, and Coles and Douglas Counties on the west. The county has an area of 398,910 acres, or about 623 square miles. In 1990, the population of the county was about 19,595 and that of Paris, the county seat and largest town, was about 8,987 (U.S. Department of Commerce, 1993).

This soil survey updates the survey of Edgar County published in 1917 (Hopkins and others, 1917). It provides additional information and has larger maps, which show the soils in greater detail.

General Nature of the County

This section provides general information about Edgar County. It describes history and development; commerce and resources; physiography, relief, and drainage; and climate.

History and Development

Although Fort Vincennes was established in the lower Wabash Valley as early as 1702, it was more than 100 years later that significant upstream migration occurred (Perrin and others, 1879). In 1803, the Treaty of Fort Wayne opened the upper Wabash Valley for settlement. General William Henry Harrison, acting as Governor of the Indiana Territory (including Illinois), began acquiring land through treaty and purchase from the Kickapoo Indians, who were occupying the area.

By 1804, Harrison had acquired 51 million acres; by 1809, the boundaries of the "Harrison Purchase" had been delineated. The western boundary (the Old Indian Boundary Line) runs through Edgar County from a line just west of Oliver at the southern edge of the county and passing just east of the Paris city limits. About a mile north of the county line, the boundary cuts back to the southeast and crosses the county a little more than a mile from the northeast corner.

In the early spring of 1817, the first group of settlers, mostly Kentuckians, arrived in Edgar County. Their settlement was along the timbered margin of the north arm of Grand Prairie, now a part of Hunter Township. This area was part of Crawford County until 1820, when it became a part of Clark County. In 1822, the land west of the Old Indian Boundary Line was purchased from the 300 Kickapoo Indians who still remained in the county, and in January of 1823, Edgar County became a separate entity. That same year the site for the county seat was chosen. This community was named Paris.

Although the original settlers were mostly from Kentucky, people were moving in from all of the various states and bringing along their agricultural traditions. Since they lacked a dependable transportation network, agriculture developed to supply the local demand. An apple orchard was

Figure 1.—Location of Edgar County in Illinois.

planted during the first year of settlement. Homespun clothing was one of the immediate local needs, so some preliminary attempts were made to grow cotton and flax. This need was successfully addressed, however, with the introduction of sheep in 1822.

Road building within the county commenced in 1823, and the first State road was established in 1825. It was not until the early 1870's that the railroads actually arrived in the county, and then several of them developed simultaneously.

In 1850, development of the poorly drained prairie lands was given a boost when the Federal government turned over all of its wetland to the respective State governments. Money from the land sales was to be used to provide drainage. From 1850 to 1880, the prairie lands were rapidly changed from a cattle range to cropland.

By the turn of the century, the population of the county was more than 28,000. About 78 percent of the population lived outside the city of Paris. Paris had become an important railroad center, and farmers were able to produce for the mass market. This ability resulted in less diversification on the farm, but it opened new possibilities for urban industrialization.

Commerce and Resources

Soil is a major and valuable resource in Edgar County. It provides a base for agriculture, which is the mainstay of the county's economy. In 1992, there were 823 farms in the county on approximately 354,000 acres. The average farm size was about 431 acres (U.S. Department of Commerce, 1994). The major crops are corn and soybeans. Secondary farm products include wheat, oats, hay, cattle, hogs, and dairy products. The county has some of the most productive farmland in the State. Most of the soils are nearly level or gently sloping and formed in medium textured soil material under tall prairie grasses. Combined with a favorable climate, these factors result in highly productive farmland.

Unimproved land along the major creeks is mostly woodland, which is utilized as a source of both firewood and lumber. The many manmade ponds and the streams provide opportunities for fishing. Bluegill, bass, crappie, and catfish are the major game fish. Twin Lakes, the largest water impoundment in the county, is used for boating and other recreational activities. The lakes are also the principal water source for the community of Paris.

Although the number of railroads has declined dramatically in recent years, Edgar County has developed a moderate industrial base, especially in agricultural processing and supply, machine work, and specialty rubber, plastic, and metal fabrication.

Mineral resources include some small deposits of natural gas; crude oil; four beds of coal that are of mineable thickness; limestone that has been sporadically mined for road gravel and agricultural limestone; and potentially valuable deposits of sand and gravel.

The transportation facilities in Edgar County include Federal and State highways, county and township roads, railroads, and small airports. U.S. Route 36 runs from east to west across the northern part of the county, and Illinois 49 runs from north to south along the western side of the county. Illinois Highways 1, 16, and 133 and U.S. Highway 150 all intersect in Paris. Railroads provide freight service to Paris, Chrisman, and several smaller towns in the county.

Physiography, Relief, and Drainage

Edgar County is in the Bloomington Ridged Plain and the Springfield Plain of the Central Lowland

physiographic province (Leighton and others, 1948). The Bloomington Ridged Plain is part of the Wisconsinan till plain, which is characterized by a series of end moraines and ground moraines. The Shelbyville Moraine is an end moraine that separates the Bloomington Ridged Plain from the Springfield Plain in Edgar County. The Springfield Plain is part of the Illinoian till plain, which is characterized by broad ground moraines. Except for parts along the southern edge of the county, most of the county is within the Bloomington Ridged Plain.

Between the Arcola Moraine in the central part of the county and the West Ridge Moraine in the north, the landform is a nearly level to gently sloping ground moraine. The elevation ranges from about 610 feet to about 660 feet above sea level, except where major creeks have incised the ground moraine. Overall, elevations range from about 500 feet in the southeast corner of the county to nearly 840 feet on the Shelbyville Moraine, southwest of Grandview.

Most areas are sufficiently drained for the crops commonly grown in the county. Subsurface drainage systems have been installed in fields across the county, and an extensive system of drainage ditches supplements the natural drainage. This system is especially evident in the northern and western parts of the county north of the Shelbyville Moraine. This area historically contained broad, flat prairies, wet meadows, marshes, and areas of intermittent open water. An area known locally as Goose Lake, a wide depression that was intermittently covered with water, was drained in the early part of the 20th century.

The county is divided by three major river basins. These are the Wabash River Direct Tributaries basin, the Embarras River basin, and the Little Vermilion River basin. Most of the county drains into the Wabash River Direct Tributaries basin. Some of the major creeks that drain into this basin are Brouilletts Creek, North Fork Brouilletts Creek, South Fork Brouilletts Creek, Crabapple Creek, Salt Fork, Coal Creek, Sugar Creek, Clear Creek, Big Creek, West Fork Big Creek, and Mill Creek. Some of the major creeks draining into the Embarras River basin in the western part of the county are Doyles Creek, East Donica Creek, Hickory Grove Creek, Catfish Creek, Brushy Fork, and the Little Embarras River. Only a small portion along the northern border drains into the Little Vermilion River basin. Jonathan Creek is the major creek in this area.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Paris Waterworks in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 29.1 degrees F and the average daily minimum temperature is 20.6 degrees. The lowest temperature on record, which occurred on January 18, 1930, is -23 degrees. In summer, the average temperature is 74.4 degrees and the average daily maximum temperature is 85.2 degrees. The highest recorded temperature, which occurred on July 14, 1954, is 109 degrees.

Growing degree days are shown in table 1. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 41.08 inches. Of this, 23.76 inches, or about 58 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 11.52 inches. The heaviest 1-day rainfall on record was 10.2 inches on June 28, 1957. Thunderstorms occur on about 45 days each year, and most occur in July.

The average seasonal snowfall is about 28.6 inches. The heaviest 1-day snowfall on record was 17 inches on January 31, 1982. The greatest snow depth at any one time during the period of record was 30 inches. On the average, 28 days of the year have at least 1 inch of snow on the ground.

The average relative humidity in midafternoon is about 61 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The sun shines 68 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 12.2 miles per hour, in March.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the

unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map in this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Drummer-Elburn Association

Nearly level, poorly drained and somewhat poorly drained soils that formed in loess and the underlying outwash; on outwash plains

This association consists of Drummer soils on interfluves and in depressions and drainageways and Elburn soils on interfluves. Slope ranges from 0 to 2 percent.

This association makes up about 6 percent of the county. It is about 40 percent Drummer soils, 21 percent Elburn soils, and 39 percent soils of minor extent (fig. 2).

Drummer soils are poorly drained. Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsurface layer is black, firm silty clay loam about 6 inches thick. The subsoil is about 43 inches thick. It is mottled. The upper part is gray, firm silty clay loam, and the lower part is gray, friable silt loam. The substratum to a depth of 60 inches or more is gray, mottled, friable, stratified silt loam and loam.

Elburn soils are somewhat poorly drained. Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsurface layer also is very dark gray, friable silt loam. It is about 5 inches thick. The subsoil is about 36 inches thick. The upper part is brown, friable silty clay loam. The next part is brown and yellowish brown, mottled, firm silty clay loam. The lower part is light brownish gray, mottled, friable silt loam. The substratum to a depth of 60 inches or more is yellowish brown, mottled, very friable, stratified sandy loam and loamy sand.

Of minor extent in this association are Brenton, Flanagan, Pella, and Proctor soils. The somewhat poorly drained Brenton soils and the well drained Proctor soils are in landform positions similar to those of the Elburn soils. Brenton and Proctor soils formed in a thinner layer of loess than the Elburn soils. The somewhat poorly drained Flanagan soils formed in loess and the underlying till. The poorly drained, calcareous Pella soils are in landform positions similar to those of the Drummer soils.

Most areas of this association are used for cultivated crops. Ponding and the seasonal high water table are concerns in areas of the Drummer soils. The main management needs in areas of this association are measures that maintain the drainage system and that maintain tilth and fertility.

2. Drummer-Milford Association

Nearly level, poorly drained soils that formed in loess and the underlying outwash or entirely in lacustrine sediments; on outwash plains and glacial lakes (relict)

This association consists of soils on interfluves and in depressions and drainageways. Slope ranges from 0 to 2 percent.

This association makes up about 2 percent of the county. It is about 62 percent Drummer soils, 20 percent Milford soils, and 18 percent soils of minor extent (fig. 3).

Drummer soils are on outwash plains. They formed in loess and the underlying outwash. Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsurface layer is black, firm silty clay loam about 6 inches thick. The subsoil is about 43 inches thick. It is mottled. The upper part is gray, firm

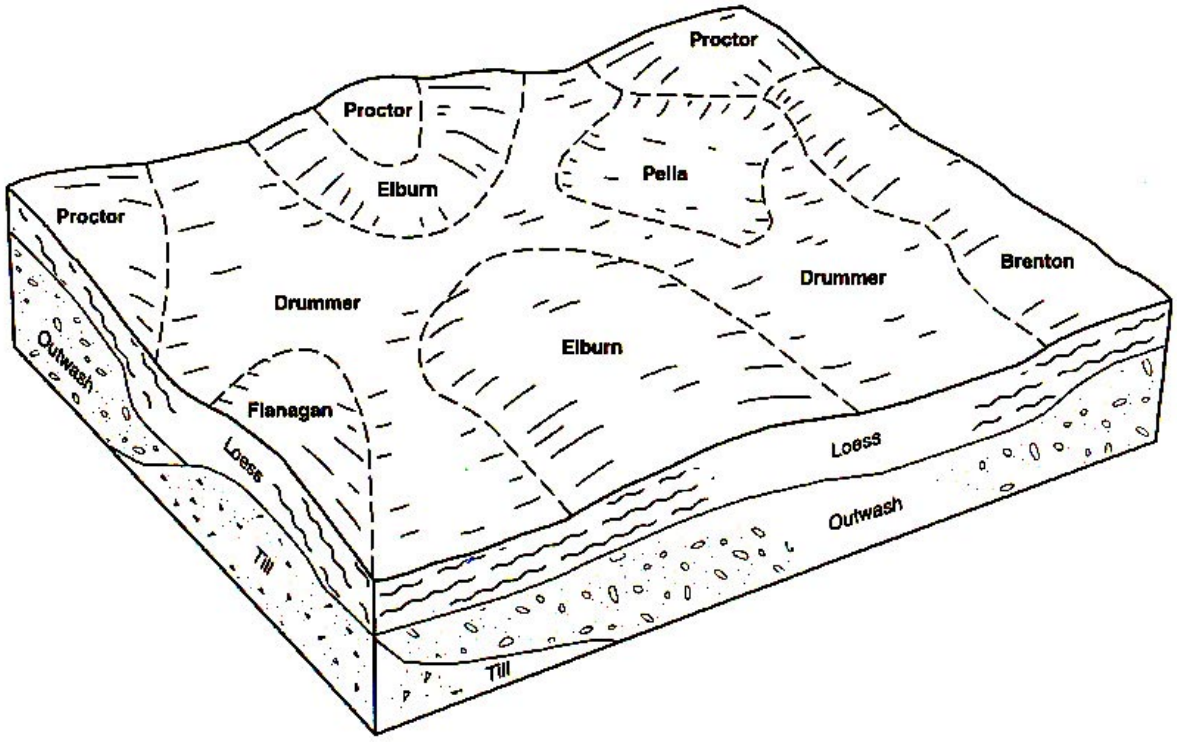

Figure 2.—Typical pattern of soils and parent material in the Drummer-Elburn association.

silty clay loam, and the lower part is gray, friable silt loam. The substratum to a depth of 60 inches or more is gray, mottled, friable, stratified silt loam and loam.

Milford soils are on glacial lakes (relict). They formed in lacustrine sediments. Typically, the surface layer is very dark gray, firm silty clay loam about 9 inches thick. The subsurface layer also is very dark gray, firm silty clay loam. It is about 4 inches thick. The subsoil is about 34 inches thick. It is mottled. The upper part is olive gray and gray, firm silty clay. The lower part is gray, firm silty clay loam. The substratum extends to a depth of 60 inches or more. The upper part is gray, mottled, firm, calcareous silt loam. The lower part is mixed light olive brown and gray, mottled, firm, calcareous, stratified very fine sandy loam and silt loam.

Of minor extent in this association are Brenton, Elburn, Pella, and Peotone soils. The somewhat poorly drained Brenton and Elburn soils are on higher parts of the interfluves than the Drummer and Milford soils. The poorly drained, calcareous Pella soils are in landform positions similar to those of the Drummer and Milford soils. The very poorly drained Peotone soils are in depressions and drainageways below the major soils.

Most areas of this association are used for cultivated crops. Ponding and the seasonal high water table are concerns. The main management needs are measures that maintain the drainage system and that maintain tilth and fertility.

3. Drummer-Flanagan Association

Nearly level, poorly drained and somewhat poorly drained soils that formed in loess and the underlying outwash or in loess and the underlying till; on ground moraines

This association consists of Drummer soils on interfluves and in depressions and drainageways and Flanagan soils on interfluves. Slope ranges from 0 to 2 percent.

This association makes up about 40 percent of the county. It is about 55 percent Drummer soils, 31 percent Flanagan soils, and 14 percent soils of minor extent (fig. 4).

Drummer soils formed in loess and the underlying outwash. They are poorly drained. Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsurface layer is black, firm silty clay loam about 6 inches thick. The subsoil is about 43

inches thick. It is mottled. The upper part is gray, firm silty clay loam, and the lower part is gray, friable silt loam. The substratum to a depth of 60 inches or more is gray, mottled, friable, stratified silt loam and loam.

Flanagan soils formed in loess and the underlying till. They are somewhat poorly drained. Typically, the surface layer is very dark gray, friable silt loam about 11 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is brown, firm silty clay. The next part is brown and grayish brown, firm silty clay loam. The lower part is grayish brown, firm, calcareous clay loam.

Of minor extent in this association are Dana, Elburn, and Toronto soils. The moderately well drained Dana soils are on higher parts of the interfluves than the major soils. The somewhat poorly drained Elburn and Toronto soils are commonly adjacent to the Flanagan soils. Elburn soils formed in loess and the underlying outwash. Toronto soils have a subsurface layer that is lighter in color than that of the Flanagan soils.

Most areas of this association are used for cultivated crops. Ponding and the seasonal high water table are concerns in areas of the Drummer soils. The main management needs in areas of this association are measures that maintain the drainage system and that maintain tilth and fertility.

4. Dana-Drummer-Raub Association

Nearly level to gently sloping, poorly drained to moderately well drained soils that formed in loess and the underlying till or in loess and the underlying outwash; on end moraines

This association consists of the gently sloping Dana and nearly level Raub soils on interfluves and the nearly level Drummer soils on interfluves and in depressions and drainageways. The Drummer soils are in low-lying areas that have outwash overlying the till. The end moraines have a general east-west linear arrangement. Slope ranges from 0 to 5 percent.

This association makes up about 15 percent of the county. It is about 35 percent Dana soils, 25 percent Drummer soils, 19 percent Raub soils, and 21 percent soils of minor extent (fig. 5).

Dana soils formed in loess and the underlying till. They are moderately well drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer also

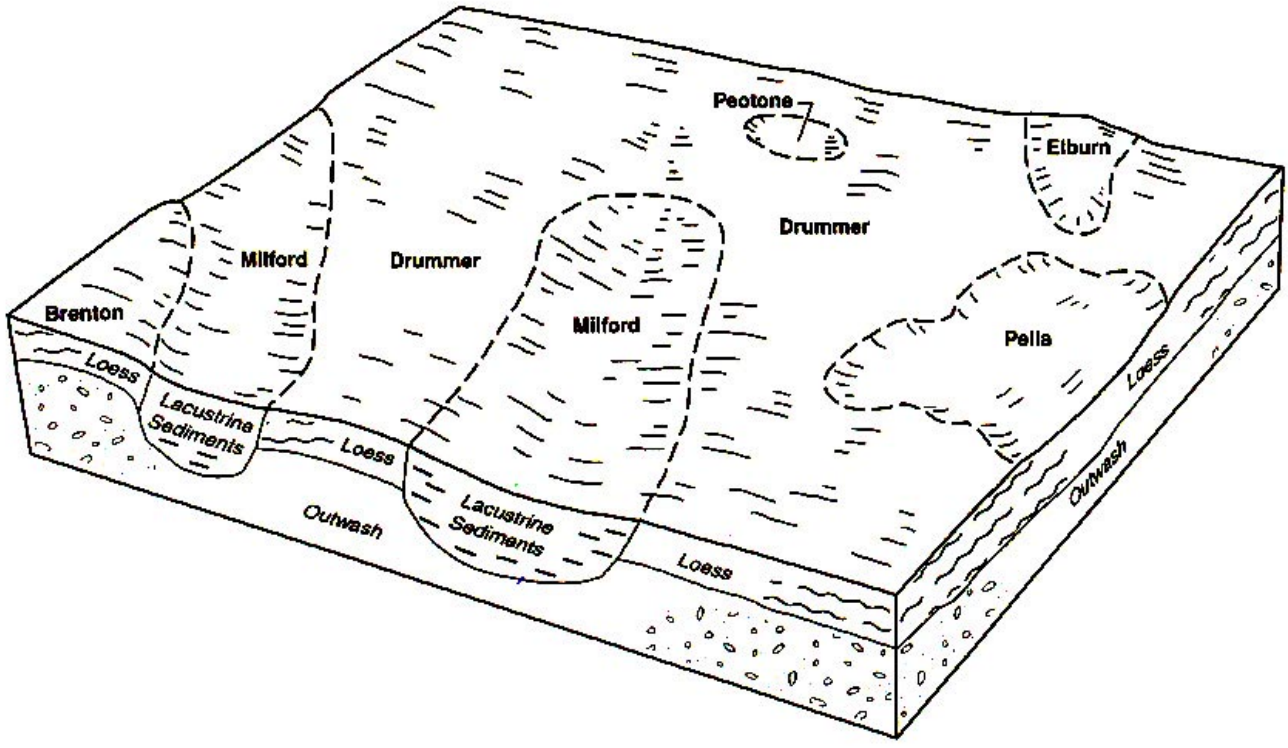

Figure 3.—Typical pattern of soils and parent material in the Drummer-Milford association.

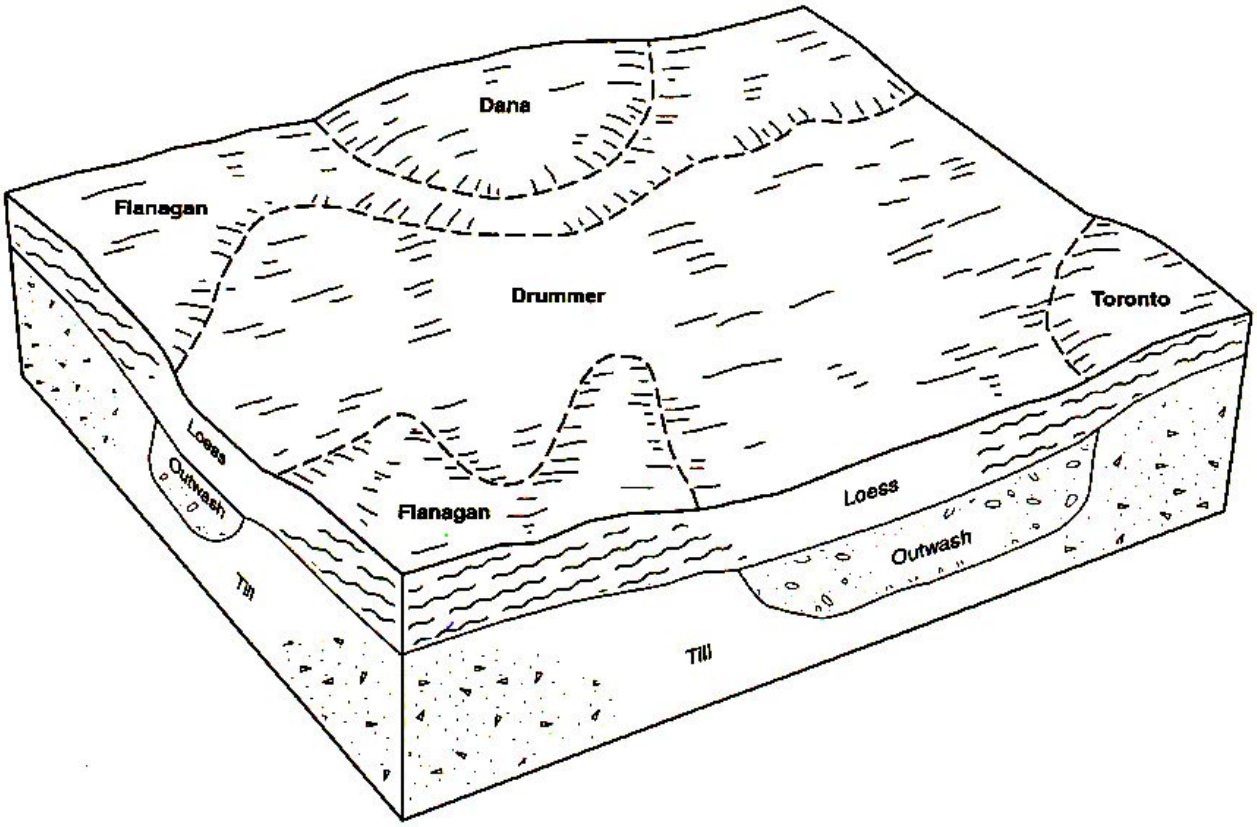

Figure 4.—Typical pattern of soils and parent material in the Drummer-Flanagan association.

is very dark grayish brown, friable silt loam. It is about 5 inches thick. The subsoil is about 40 inches thick. The upper part is dark yellowish brown and brown, friable and firm silty clay loam. The next part is yellowish brown, mottled, firm clay loam. The lower part is yellowish brown, mottled, firm, calcareous loam. The substratum to a depth of 60 inches or more is yellowish brown, mottled, firm, calcareous loam.

Drummer soils formed in loess and the underlying outwash. They are poorly drained. Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsurface layer is black, firm silty clay loam about 6 inches thick. The subsoil is about 43 inches thick. It is mottled. The upper part is gray, firm silty clay loam, and the lower part is gray, friable silt loam. The substratum to a depth of 60 inches or more is gray, mottled, friable, stratified silt loam and loam.

Raub soils formed in loess and the underlying till. They are somewhat poorly drained. Typically, the surface layer is black, very friable silt loam about 9 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is brown, firm silty clay loam. The next part is grayish brown, firm silty clay loam. The lower part is grayish brown, firm loam.

Of minor extent in this association are Wingate and Wyanet soils. The moderately well drained Wingate soils are on interfluves. They have a subsurface layer that is lighter in color than that of the Dana soils. The gently sloping and moderately sloping, well drained Wyanet soils formed in till.

Most areas of this association are used for cultivated crops. Erosion is a hazard in areas of the Dana soils. The seasonal high water table is a limitation in areas of the Drummer and Raub soils, and ponding is an additional concern in areas of the Drummer soils. The main management needs in areas of this association are measures that control erosion and maintain the drainage system, tilth, and fertility.

5. Xenia-Senachwine-Drummer Association

Nearly level to moderately sloping, poorly drained, moderately well drained, and well drained soils that formed in loess and the underlying till, entirely in till, or in loess and the underlying outwash; on end moraines and ground moraines

This association consists of Xenia soils on gently sloping interfluves, Senachwine soils on moderately sloping parts of moraines, and Drummer soils on nearly level interfluves and in depressions and drainageways. Slope ranges from 0 to 10 percent.

This association makes up about 21 percent of the county. It is about 32 percent Xenia soils, 17 percent Senachwine soils, 14 percent Drummer soils, and 37 percent soils of minor extent (fig. 6).

The moderately well drained Xenia soils formed in loess and the underlying till. Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsoil is about 45 inches thick. It is mottled. The upper part is yellowish brown, friable and firm silty clay loam. The next part is yellowish brown, firm clay loam. The lower part is yellowish brown, firm, calcareous clay loam. The substratum to a depth of 60 inches or more is yellowish brown, mottled, firm, calcareous loam.

The well drained Senachwine soils formed in till. Typically, the surface layer is mixed brown and yellowish brown, friable silt loam about 8 inches thick. The subsoil is about 28 inches thick. It is yellowish brown and firm throughout. It is silty clay loam in the upper part and clay loam in the lower part. The substratum to a depth of 60 inches or more is yellowish brown, very firm, calcareous loam.

The poorly drained Drummer soils formed in loess and the underlying outwash. Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsurface layer is black, firm silty clay loam about 6 inches thick. The subsoil is about 43 inches thick. It is mottled. The upper part is gray, firm silty clay

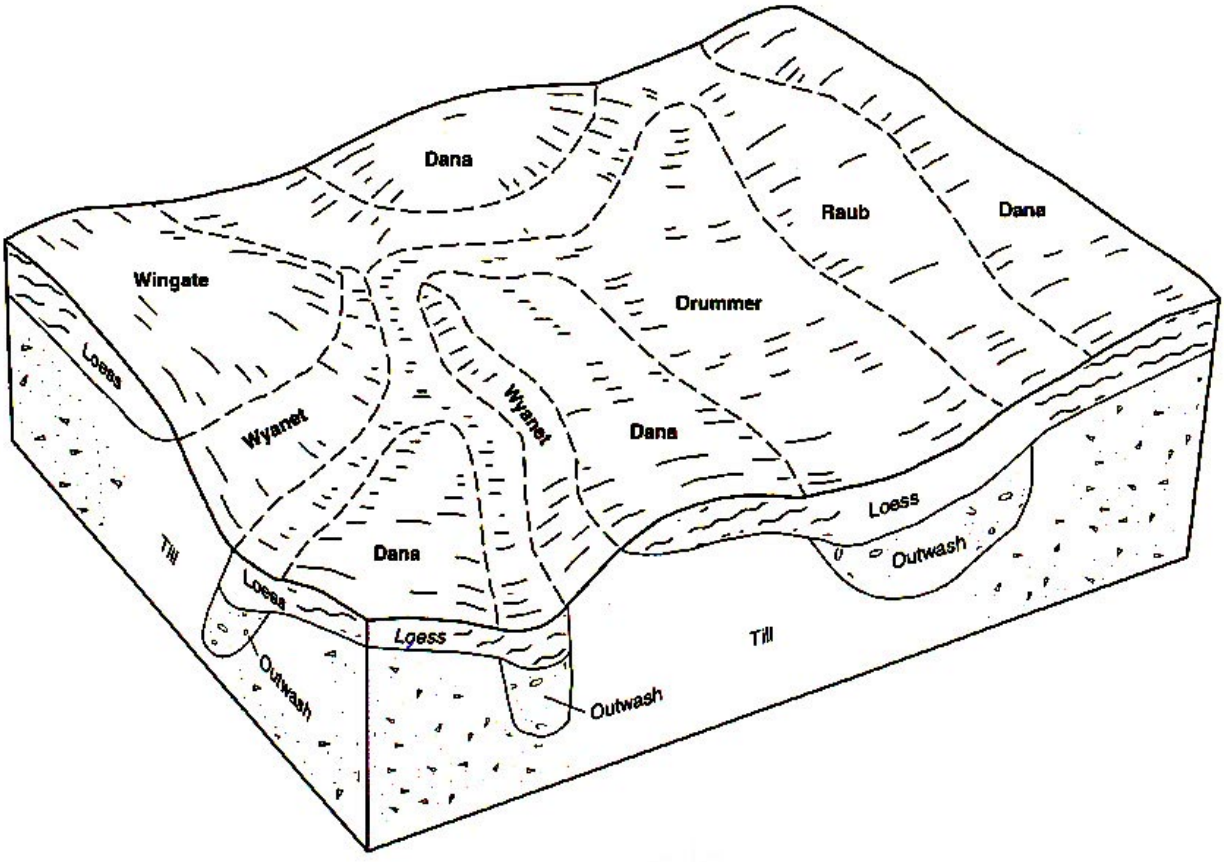

Figure 5.—Typical pattern of soils and parent material in the Dana-Drummer-Raub association.

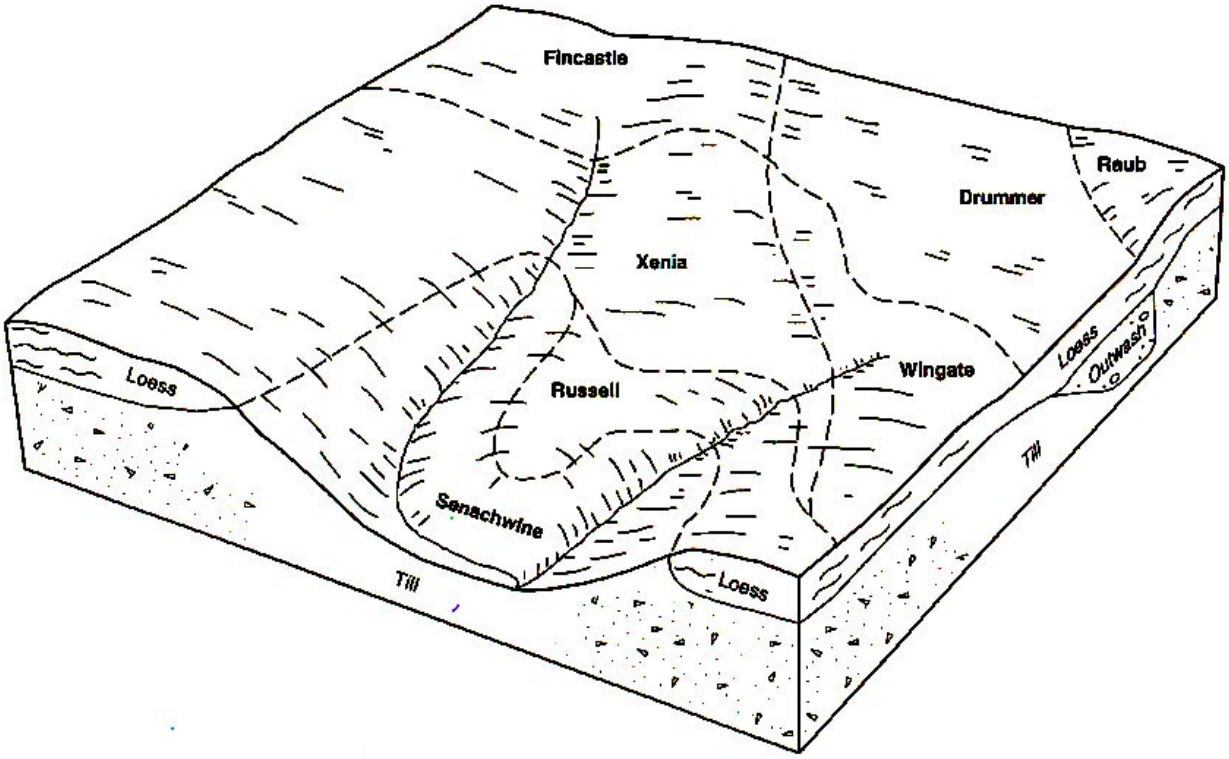

Figure 6.—Typical pattern of soils and parent material in the Xenia-Senachwine-Drummer association.

loam, and the lower part is gray, friable silt loam. The substratum to a depth of 60 inches or more is gray, mottled, friable, stratified silt loam and loam.

Of minor extent in this association are Brouillett, Fincastle, Raub, Russell, and Wingate soils. The somewhat poorly drained Brouillett soils are on flood plains below the major soils. The somewhat poorly drained Fincastle and Raub soils are in intermediate positions between the Xenia and Drummer soils. The well drained Russell soils are on higher parts of the interfluve than the Xenia soils. They formed in a thicker layer of loess than the Senachwine soils. The moderately well drained Wingate soils are in landform positions similar to those of the Xenia soils. They have a darker surface layer than the Xenia soils.

Most areas of this association are used for cultivated crops, but some areas are used for pasture, hay, or woodland. Erosion is a hazard in areas of the Xenia and Senachwine soils. The moderate or low available water capacity is a limitation in areas of the Senachwine soils, and ponding and the seasonal high water table are concerns in areas of the Drummer soils. The main management needs in areas of this association are measures that control erosion, conserve moisture, and maintain the drainage system, tilth, and fertility.

6. Senachwine-Russell Association

Gently sloping to very steep, well drained soils that formed in till or in loess and the underlying till; on end moraines and ground moraines

This association consists of Senachwine soils on moderately steep to very steep parts of moraines and Russell soils on gently sloping and moderately sloping interfluves. These soils are in areas near the major creeks and tributaries. Slope ranges from 2 to 60 percent.

This association makes up about 8 percent of the county. It is about 40 percent Senachwine soils, 36 percent Russell soils, and 24 percent soils of minor extent (fig. 7).

Senachwine soils formed in till. Typically, the surface layer is dark yellowish brown, friable silt loam about 8 inches thick. The subsoil is about 29 inches thick. It is

yellowish brown, firm clay loam. The substratum to a depth of 60 inches or more is yellowish brown, firm, calcareous loam.

Russell soils formed in loess and the underlying till. Typically, the surface layer is brown, friable silt loam about 6 inches thick. The subsurface layer is yellowish brown, friable silt loam about 7 inches thick. The subsoil is about 34 inches thick. The upper part is dark yellowish brown, firm silty clay loam. The lower part is dark yellowish brown, firm clay loam. The substratum to a depth of 60 inches or more is yellowish brown, firm, calcareous loam.

Of minor extent in this association are Genesee, Shoals, Stonelick, and Xenia soils. The well drained Genesee and Stonelick soils and the somewhat poorly drained Shoals soils are on flood plains below the major soils. The moderately well drained Xenia soils are on broader and slightly lower parts of the interfluves than the Russell soils.

Most areas of this association are used for cultivated crops, but some areas are used for pasture, hay, or woodland. Erosion is a hazard in areas of the major soils. Because of the slope, the use of equipment is limited in areas of the Senachwine soils. The main management needs in areas of this association are measures that control erosion and maintain tilth and fertility.

7. Camden-Starks Association

Nearly level to moderately sloping, somewhat poorly drained and well drained soils that formed in loess and the underlying outwash; on outwash plains and stream terraces

This association consists of the nearly level to moderately sloping Camden and nearly level Starks soils on interfluves. Slope ranges from 0 to 10 percent.

This association makes up about 4 percent of the county. It is about 43 percent Camden soils, 19 percent Starks soils, and 38 percent soils of minor extent (fig. 8).

Camden soils are well drained. Typically, the surface layer is brown, friable silt loam about 7 inches thick.

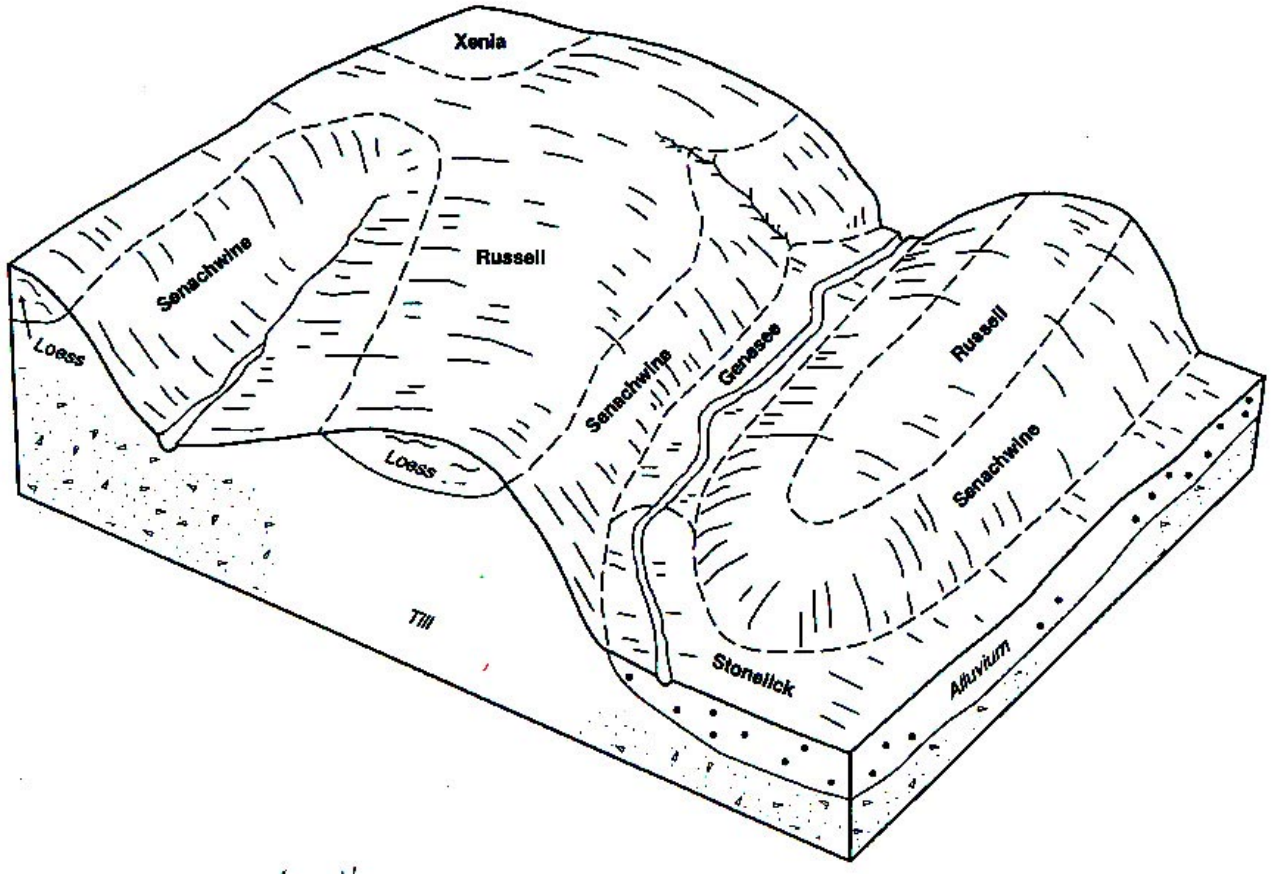

Figure 7.—Typical pattern of soils and parent material in the Senachwine-Russell association.

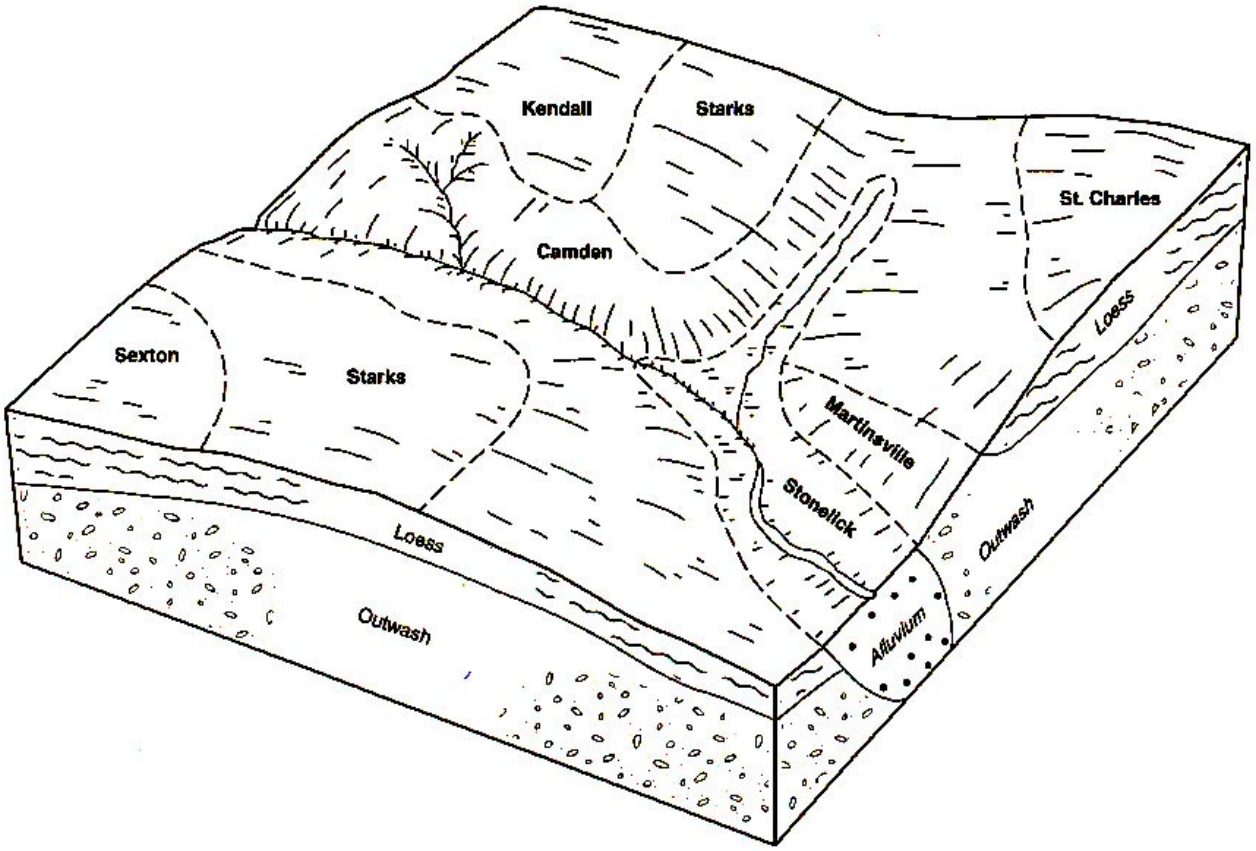

Figure 8.—Typical pattern of soils and parent material in the Camden-Starks association.

The subsoil extends to a depth of 60 inches or more. The upper part is dark yellowish brown, friable silt loam and yellowish brown, firm silty clay loam. The next part is yellowish brown, firm sandy clay loam. The lower part is yellowish brown, friable sandy loam.

Starks soils are somewhat poorly drained. Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsurface layer is brown, mottled, friable silt loam about 4 inches thick. The subsoil is about 27 inches thick. It is mottled. The upper part is brown and light brownish gray, firm silty clay loam. The next part is light brownish gray, firm sandy clay loam. The lower part is dark yellowish brown, friable sandy loam. The substratum extends to a depth of 60 inches or more. It is mottled. The upper part is dark yellowish brown, friable, stratified sandy loam and sandy clay loam. The lower part is yellowish brown, friable loam.

Of minor extent in this association are Genesee, Kendall, Martinsville, Sexton, Shoals, St. Charles, and Stonelick soils. The well drained Genesee and Stonelick soils and the somewhat poorly drained Shoals soils are on flood plains below the major soils. The somewhat poorly drained Kendall soils are commonly adjacent to the Starks soils. They formed in a thicker layer of loess than the Starks soils. The well drained Martinsville and St. Charles soils are in gently sloping positions similar to those of the Camden soils. Martinsville soils formed entirely in outwash. St. Charles soils have a thicker layer of loess than the Camden soils. The poorly drained Sexton soils are lower on the landform than the Starks soils.

Most areas of this association are used for cultivated crops, but some areas are used for pasture, hay, or woodland. Erosion is a hazard in the more sloping areas of the Camden soils. The seasonal high water table is a limitation in areas of the Starks soils. The main management needs in areas of this association are measures that control erosion, that maintain the drainage system, and that maintain tilth and fertility.

8. Weir-Stoy-Hickory Association

Nearly level to very steep, poorly drained, somewhat poorly drained, and well drained soils that formed in loess or in till; on ground moraines

This association consists of the nearly level Weir and nearly level and gently sloping Stoy soils on interfluves and Hickory soils on steep and very steep parts of moraines. Slope ranges from 0 to 60 percent.

This association makes up about 4 percent of the county. It is about 28 percent Weir soils, 27 percent Stoy soils, 11 percent Hickory soils, and 34 percent soils of minor extent (fig. 9).

The poorly drained Weir soils formed in loess. Typically, the surface layer is grayish brown, friable silt loam about 8 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches or more. It is gray, mottled, firm silty clay loam.

The somewhat poorly drained Stoy soils formed in loess. Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsurface layer is brown, mottled, friable silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish brown, friable silty clay loam. The next part is yellowish brown, mottled, friable and firm silty clay loam. The lower part is yellowish brown, mottled, firm, slightly brittle silty clay loam and silt loam.

The well drained Hickory soils formed in till. Typically, the surface layer is dark grayish brown, friable loam about 4 inches thick. The subsurface layer is light yellowish brown, friable loam about 4 inches thick. The subsoil is about 40 inches thick. It is yellowish brown, firm clay loam. The substratum to a depth of 60 inches or more is brown, friable, calcareous loam.

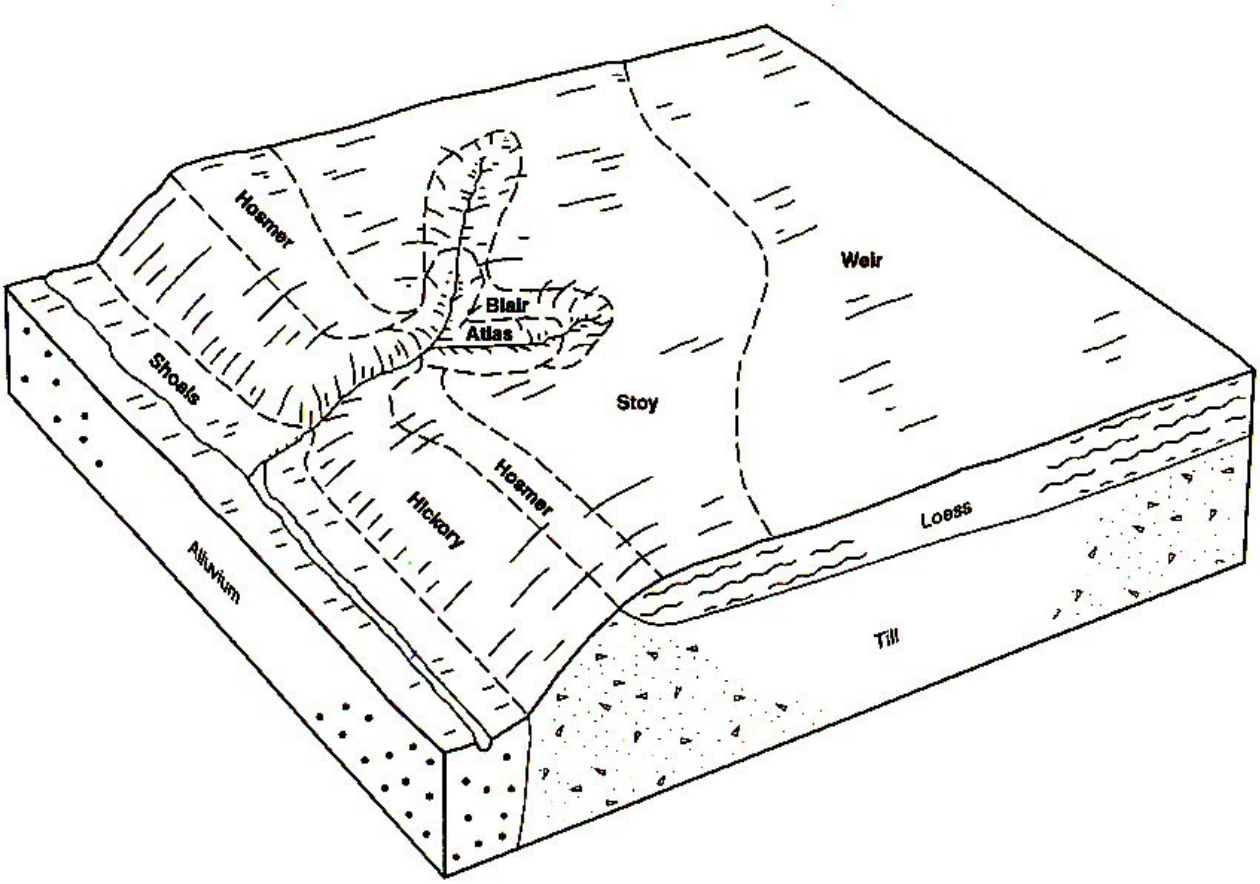

Figure 9.—Typical pattern of soils and parent material in the Weir-Stoy-Hickory association.

Of minor extent in this association are Atlas, Blair, Genesee, Hosmer, Shoals, and Stonelick soils. The somewhat poorly drained, moderately steep Atlas soils and the moderately sloping Blair soils are above the Hickory soils on the landform. The well drained Genesee and Stonelick soils and the somewhat poorly drained Shoals soils are on flood plains below the major soils. The moderately well drained Hosmer soils are higher on the landform than the Stoy and Weir soils.

Most areas of this association are used for cultivated crops, but some areas are used for pasture, hay, or woodland. The seasonal high water table is a limitation in areas of the Weir and Stoy soils. Erosion is a hazard in gently sloping areas of the Stoy soils. Because of the slope, erosion is also a hazard in areas of the Hickory soils. The use of equipment is limited in areas of these soils. The main management needs in areas of this association are measures that control erosion, that maintain the drainage system, and that maintain tilth and fertility.

Broad Land Use Considerations

The soils in Edgar County vary widely in their suitability for major land uses. Most of the soils are used for cultivated crops, mainly corn and soybeans. Other agricultural land uses include pasture, hay, and woodland. Soils that are not used for agriculture are generally used for building site development, recreation, or wildlife habitat.

The soils in associations 1, 2, 3, and 4 are well suited to cultivated crops. The nearly level to moderately sloping soils in associations 5, 6, 7, and 8 are well suited or moderately suited to cultivated crops. Soils on the steeper slopes in these associations are poorly suited or generally unsuited to cultivated crops, depending on the steepness of the slope. Flooding is a hazard in some of the minor soils in associations 5, 6, 7, and 8.

Scattered areas of pasture and hay occur throughout the county, but most areas are in associations 5, 6, 7, and 8. The nearly level to moderately sloping soils in these associations are well suited or moderately suited to pasture and hay. Soils on the steeper slopes are poorly suited or generally unsuited to pasture and hay, depending on the steepness of the slope.

Most of the woodland is in associations 5, 6, 7, and 8 on sloping soils near the major creeks. Most of the soils in these associations are well suited or moderately suited to woodland. Only a small acreage of the woodland in Edgar County is managed for timber production. Most areas are managed for wildlife habitat, are used as recreational areas, or are kept as wooded tracts for esthetic purposes.

Various limitations affect the soils in the county for building site development. Buildings have been constructed in all of the associations, but they are most common in associations 3, 4, 5, and 6 around Paris. The soils in these associations range from well suited to poorly suited to this use. Generally, the gently sloping, moderately well drained and well drained soils in associations 4, 5, 6, and 7 are better suited to building site development than other soils. The ponding, the seasonal high water table, the shrink-swell potential, and the slope are the major limitations in areas used as building sites. In areas used for septic tank absorption fields, the seasonal high water table, the ponding, and the restricted permeability are limitations. Some of the minor soils in these associations are subject to flooding. Soils that are subject to flooding or ponding are generally unsuited to building site development and to use as sites for sewage disposal systems.

Wooded slopes, streams, and the variety of landforms make associations 5, 6, 7, and 8 attractive for recreational uses, although some areas in all associations are suited to recreational development. The soils in the county range from well suited to poorly suited to recreational development, depending upon the intensity of the expected use. The slope, the restricted permeability, and wetness are the major limitations affecting recreational development.

Most of the soils in Edgar County are well suited or moderately suited to habitat for a variety of wildlife. Working with the natural properties of the soil helps in the establishment of viable grassland, woodland, or wetland plant and animal communities. For example, the wetness in small depressional areas, mainly in associations 1, 2, 3, and 4, could be enhanced, thus restoring valuable wetland habitat. In other areas of these associations, the soils are well suited to restoring native tall-grass prairie for openland wildlife habitat. Many areas in associations 5, 6, 7, and 8 are well suited to the enhancement or establishment of woodland wildlife habitat. The hazard of erosion on gently sloping to very steep soils should be considered when habitat is created or restored and when crops are planted as a food source for wildlife.

Detailed Soil Map Units

The map units on the detailed soil maps in this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a ***soil series***. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into ***soil phases***. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Senachwine silt loam, 10 to 18 percent slopes, eroded, is a phase of the Senachwine series.

Some map units are made up of two or more major soils. These map units are called complexes. A ***complex*** consists of two or more soils, or one or more soils and miscellaneous areas, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Orthents, silty, bedrock substratum-Pits, mine, complex, steep, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes ***miscellaneous areas***. Such areas have little or no soil material and support little or no vegetation. The component Pits, mine, in the complex Orthents, silty, bedrock substratum-Pits, mine, complex, steep, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see Contents) give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

5C2—Blair silt loam, 5 to 10 percent slopes, eroded

Composition

Blair and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Ground moraines
Landform position: Backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess and/or water-worked sediments and the underlying till that contains a strongly developed paleosol
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—dark yellowish brown, friable silt loam

Subsoil:
5 to 10 inches—yellowish brown, mottled, firm silty clay loam
10 to 49 inches—light brownish gray and gray, mottled, very firm and firm silty clay loam
49 to 60 inches—gray, mottled, friable clay loam

Inclusions

Contrasting inclusions:
• The moderately well drained Hosmer soils and the somewhat poorly drained Stoy soils, which have a dense and brittle layer in the lower part of the subsoil; on summits and backslopes above the Blair soil

Similar soils:
• Soils that have more clay in the upper part of the subsoil
• Soils that have more sand in the subsoil
• Soils that are severely eroded and have a surface layer of silty clay loam

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• Further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, a rotation that includes 1 or more years of forage crops, contour farming, terraces, or a combination of these practices helps to control erosion.
• Subsurface drainage systems and diversions help to lower the seasonal high water table if suitable outlets are available.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour or using a no-till method for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Subsurface drainage systems and diversions help to lower the seasonal high water table if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing during wet periods can help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management considerations:
• Planting mature stock and planting on ridges reduce the seedling mortality rate. Some replanting may be necessary.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 3e
Woodland ordination symbol: 4A

7D2—Atlas silt loam, 10 to 18 percent slopes, eroded

Composition

Atlas and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Ground moraines
Landform position: Backslopes
Major use: Pasture and hay

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Very slow
Parent material: Loess and the underlying till that contains a strongly developed paleosol
Runoff: Rapid
Available water capacity: Moderate
Depth to the seasonal high water table: 0.5 foot to 1.5 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—dark grayish brown, friable silt loam

Subsoil:
5 to 13 inches—brown, friable clay loam
13 to 47 inches—grayish brown, light brownish gray, and gray, mottled, firm clay loam
47 to 60 inches—light brownish gray, mottled, firm clay loam

Inclusions

Contrasting inclusions:
• The moderately well drained Hosmer soils and the somewhat poorly drained Stoy soils, which have a dense and brittle layer in the lower part of the subsoil; on summits and backslopes above the Atlas soil

Similar soils:
• Soils that have less clay in the subsoil
• Soils that are severely eroded and have a surface layer of clay loam
• Soils that have slopes of slightly less than 10 percent

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• Further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, a rotation that includes 1 or more years of forage crops, contour farming, terraces, or a combination of these practices helps to control erosion.
• Subsurface drainage systems and diversions help to lower the seasonal high water table if suitable outlets are available.
• The moderate available water capacity is a limitation. Leaving crop residue on the surface after planting and returning crop residue to the soil or regularly adding other organic material conserve soil moisture. These practices also help to maintain tilth and fertility.

Pasture and hay

Suitability: Poorly suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• Tilling on the contour or using a no-till method for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Subsurface drainage systems and diversions help to lower the seasonal high water table if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Moderately suited
Management considerations:
• Planting mature stock and planting on ridges reduce the seedling mortality rate. Some replanting may be necessary.
• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland can reduce the windthrow hazard.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Poorly suited
Management considerations:
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 4e
Woodland ordination symbol: 4C

8F—Hickory loam, 18 to 35 percent slopes

Composition

Hickory and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Ground moraines
Landform position: Backslopes
Major uses: Pasture and hay, woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 4 inches—dark grayish brown, friable loam

Subsurface layer:
4 to 8 inches—light yellowish brown, friable loam

Subsoil:
8 to 48 inches—yellowish brown, firm clay loam

Substratum:
48 to 60 inches—brown, friable, calcareous loam

Inclusions

Contrasting inclusions:
• The moderately well drained Hosmer soils and the somewhat poorly drained Stoy soils, which have a dense and brittle layer in the lower part of the subsoil; on summits and backslopes above the Hickory soil

Similar soils:
• Soils that are eroded and have subsoil material mixed in the surface layer
• Soils that have calcareous till within a depth of 40 inches
• Soils that have a mantle of loess above the till and have a surface layer of silt loam

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Poorly suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• A no-till method for seeding or pasture renovation helps to establish forage species and helps to control erosion. The use of machinery is limited because of the slope.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Moderately suited
Management considerations:
• Because of the slope, erosion is a hazard and the use of equipment is limited.
• Establishing logging roads and skid trails on or near the contour and seeding bare areas to grass or to a grass-legume mixture after logging has been completed reduce the hazard of erosion.
• Logs or trees should be skidded uphill with a cable and winch.
• Grass firebreaks can be used in areas of this soil.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: 6e
Woodland ordination symbol: 5R

8G—Hickory loam, 35 to 60 percent slopes

Composition

Hickory and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: Ground moraines
Landform position: Backslopes
Major use: Woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Till
Runoff: Rapid
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 5 inches—dark grayish brown, friable loam

Subsurface layer:
5 to 8 inches—yellowish brown, friable loam

Subsoil:
8 to 21 inches—yellowish brown, friable clay loam
21 to 52 inches—yellowish brown, firm clay loam

Substratum:
52 to 60 inches—brown, very firm, calcareous loam

Inclusions

Contrasting inclusions:
• The moderately well drained Hosmer soils and the somewhat poorly drained Stoy soils, which have a dense and brittle layer in the lower part of the subsoil; on summits and backslopes above the Hickory soil

Similar soils:
• Soils that have calcareous till within a depth of 40 inches
• Soils that have slopes of slightly less than 35 percent or more than 60 percent

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Generally unsuited because of the slope

Woodland

Suitability: Poorly suited
Management considerations:
• Because of the slope, erosion is a hazard and the use of equipment is limited.
• Establishing logging roads and skid trails on or near the contour and seeding bare areas to grass or to a grass-legume mixture after logging has been completed reduce the hazard of erosion.
• Logs or trees should be skidded uphill with a cable and winch.
• Grass firebreaks can be used in areas of this soil.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: 7e
Woodland ordination symbol: 5R

50A—Virden silt loam, 0 to 2 percent slopes

Composition

Virden and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves and depressions on ground moraines
Landform position: Summits on interfluves; toeslopes in depressions
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Loess
Runoff: Slow to ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Ponding duration: Brief
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—very dark gray, friable silt loam

Subsurface layer:
6 to 11 inches—very dark gray, firm silt loam

Subsoil:
11 to 16 inches—very dark gray, mottled, friable silty clay loam
16 to 52 inches—dark gray and gray, mottled, firm silty clay
52 to 60 inches—gray, mottled, friable silty clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Oconee and Stoy soils on nearly level summits above the Virden soil

Similar soils:
• Soils that are lighter in color in the upper part of the subsoil
• Soils that have less clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table and ponding delay planting in some years. Surface and subsurface drainage systems and land grading help to lower the seasonal high water table and reduce the ponding hazard if suitable outlets are available.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• The seasonal high water table and ponding of surface water restrict the growth of some forage crops and limit the choice of plants and the period of grazing or cutting. Surface and subsurface drainage systems and land grading help to lower the seasonal high water table and reduce the ponding hazard if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: 2w

56B—Dana silt loam, 2 to 5 percent slopes

Composition

Dana and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderately slow
Parent material: Loess and the underlying till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 2.0 to 3.5 feet
Organic matter content: Moderate
Erosion hazard: Moderate

Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—very dark grayish brown, friable silt loam

Subsurface layer:
7 to 12 inches—very dark grayish brown, friable silt loam

Subsoil:
12 to 29 inches—dark yellowish brown and brown, friable and firm silty clay loam
29 to 46 inches—yellowish brown, mottled, firm clay loam
46 to 52 inches—yellowish brown, mottled, firm, calcareous loam

Substratum:
52 to 60 inches—yellowish brown, mottled, firm, calcareous loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils on summits and toeslopes below the Dana soil

Similar soils:
• Soils that have a surface layer that is lighter in color
• Soils that are eroded and have subsoil material mixed in the surface layer
• Soils that have more sand in the upper part of the subsoil
• Soils that have outwash overlying the till

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited to dwellings without basements; poorly suited to dwellings with basements
Management considerations:
• Installing subsurface tile drains near the foundations helps to lower the water table. Wetness is a more severe limitation on sites for dwellings with basements than on sites for dwellings without basements.
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e

56B2—Dana silt loam, 2 to 5 percent slopes, eroded

Composition

Dana and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderately slow
Parent material: Loess and the underlying till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 2.0 to 3.5 feet
Organic matter content: Moderate

Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 10 inches—mixed very dark grayish brown and brown, friable silt loam

Subsoil:
10 to 38 inches—brown and yellowish brown, friable and firm silty clay loam
38 to 59 inches—yellowish brown, mottled, firm loam

Substratum:
59 to 60 inches—yellowish brown, mottled, firm, calcareous loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils on summits and toeslopes below the Dana soil
• The somewhat poorly drained Flanagan soils on summits below the Dana soil

Similar soils:
• Soils that are less eroded and in which the surface layer is not mixed with subsoil material
• Soils that have more sand in the upper part of the subsoil
• Soils that have outwash overlying the till
• Soils that have less sand in the lower part of the subsoil
• Soils that have slopes of slightly more than 5 percent

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited to dwellings without basements; poorly suited to dwellings with basements
Management considerations:
• Installing subsurface tile drains near the foundations helps to lower the water table. Wetness is a more severe limitation on sites for dwellings with basements than on sites for dwellings without basements.
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e

67A—Harpster silty clay loam, 0 to 2 percent slopes

Composition

Harpster and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: Interfluves and depressions on outwash plains and ground moraines
Landform position: Summits on interfluves; toeslopes in depressions
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Calcareous loess
Runoff: Slow to ponded
Available water capacity: High

Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Ponding duration: Brief
Organic matter content: High
Hazard of soil blowing: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—black, friable, calcareous silty clay loam

Subsurface layer:
8 to 12 inches—black, friable, calcareous silty clay loam

Subsoil:
12 to 20 inches—dark gray, friable, calcareous silty clay loam
20 to 35 inches—dark gray and gray, mottled, firm, calcareous silty clay loam
35 to 41 inches—gray, mottled, friable, calcareous silt loam

Substratum:
41 to 60 inches—gray, mottled, friable, calcareous silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Elburn and Flanagan soils on summits above the Harpster soil

Similar soils:
• Soils that are not calcareous in the upper part of the profile

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table and ponding delay planting in some years. Surface and subsurface drainage systems and land grading help to lower the seasonal high water table and reduce the ponding hazard if suitable outlets are available.
• Tilling when the soil is wet causes surface cloddiness and compaction.
• Soil blowing is a moderate hazard. Using a system of conservation tillage, such as no-till or mulch till, that leaves crop residue on the surface after planting, planting at right angles to the prevailing winds, avoiding fall tillage, planting cover crops, and establishing field windbreaks help to control soil blowing.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• The seasonal high water table and ponding of surface water restrict the growth of some forage crops and limit the choice of plants and the period of grazing or cutting. Surface and subsurface drainage systems and land grading help to lower the seasonal high water table and reduce the ponding hazard if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: 2w

69A—Milford silty clay loam, 0 to 2 percent slopes

Composition

Milford and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves, depressions, and drainageways on glacial lakes (relict)
Landform position: Summits on interfluves; toeslopes in depressions and drainageways
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderately slow
Parent material: Lacustrine sediments
Runoff: Slow to ponded

Available water capacity: High
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Ponding duration: Brief (fig. 10)
Organic matter content: High
Hazard of soil blowing: Moderate
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—very dark gray, firm silty clay loam

Subsurface layer:
9 to 13 inches—very dark gray, firm silty clay loam

Subsoil:
13 to 41 inches—olive gray and gray, mottled, firm silty clay
41 to 47 inches—gray, mottled, firm silty clay loam

Substratum:
47 to 57 inches—gray, mottled, firm, calcareous silt loam
57 to 60 inches—mixed light olive brown and gray, mottled, firm, calcareous, stratified very fine sandy loam and silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Brenton and Elburn soils on summits above the Milford soil

Similar soils:
• Soils that are darker in the upper part of the subsoil
• Soils that have less clay in the subsoil
• Soils that have outwash within a depth of 60 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table and ponding delay planting in some years. Surface and subsurface drainage systems and land grading help to lower the seasonal high water table and reduce the ponding hazard if suitable outlets are available.
• Tilling when the soil is wet causes surface cloddiness and compaction.
• Soil blowing is a moderate hazard. Using a system of conservation tillage, such as no-till or mulch till, that leaves crop residue on the surface after planting, planting at right angles to the prevailing winds, avoiding fall tillage, planting cover crops, and establishing field windbreaks help to control soil blowing.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• The seasonal high water table and ponding of surface water restrict the growth of some forage crops and limit the choice of plants and the period of grazing or cutting. Surface and subsurface drainage systems and land grading help to lower the seasonal high water table and reduce the ponding hazard if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: 2w

104A—Virgil silt loam, 0 to 2 percent slopes

Composition

Virgil and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Interfluves on outwash plains
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 0.5 foot to 2.0 feet
Organic matter content: Moderate
Erosion hazard: Slight

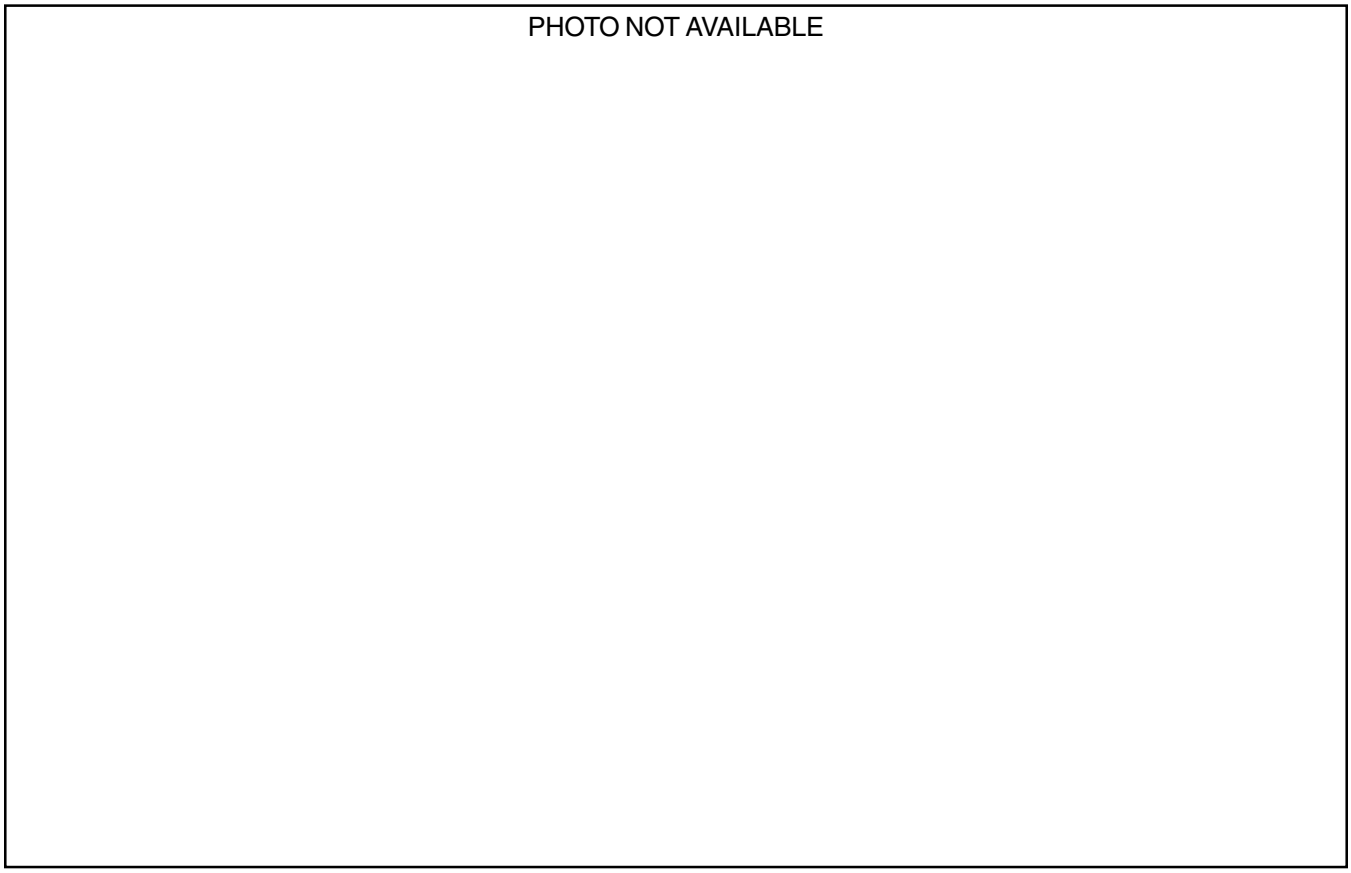

Figure 10.—Ponding in an area of Milford silty clay loam, 0 to 2 percent slopes, near historic Goose Lake. Drummer silty clay loam, 0 to 2 percent slopes, is in the foreground.

Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—very dark grayish brown, friable silt loam

Subsurface layer:
7 to 10 inches—dark grayish brown, mottled, friable silt loam

Subsoil:
10 to 43 inches—grayish brown and brown, mottled, firm silty clay loam
43 to 60 inches—grayish brown, mottled, friable clay loam

Inclusions

Contrasting inclusions:
- The well drained Harvard soils on gently sloping summits above the Virgil soil

Similar soils:
- Soils that have till within a depth of 60 inches
- Soils that have more sand in the upper part of the subsoil
- Soils having a surface layer that is lighter in color

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- No major limitations affect the use of this soil for crop production if surface and subsurface drainage systems are maintained.
- Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Alsike clover, reed canarygrass, ladino clover, tall

fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• No major limitations affect the use of this soil for pasture and hay if surface and subsurface drainage systems are maintained.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 1

112A—Cowden silt loam, 0 to 2 percent slopes

Composition

Cowden and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: Interfluves on ground moraines
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Slow
Parent material: Loess
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: Less than 1 foot
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark grayish brown, friable silt loam

Subsurface layer:
8 to 17 inches—gray, mottled, friable silt loam

Subsoil:
17 to 33 inches—gray and light brownish gray, mottled, firm silty clay
33 to 46 inches—gray, mottled, firm silty clay loam
46 to 60 inches—gray, mottled, firm and friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Stoy soils on summits and backslopes above the Cowden soil
• Soils that are subject to ponding in the spring

Similar soils:
• Soils having a surface layer that is lighter in color
• Soils that have a very dark grayish brown surface layer that is more than 10 inches thick
• Soils that have more sand in the lower part of the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table delays planting in some years. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• The seasonal high water table restricts the growth of some forage crops and limits the choice of plants and the period of grazing or cutting. Surface and subsurface drainage systems help to lower the water table if suitable outlets are available.

• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations helps to lower the water table.
• Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water from the site also help to overcome the wetness.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2w

113A—Oconee silt loam, 0 to 2 percent slopes

Composition

Oconee and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on ground moraines
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow
Parent material: Loess
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 0.5 foot to 2.0 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown, friable silt loam

Subsurface layer:
9 to 12 inches—grayish brown, mottled, friable silt loam

Subsoil:
12 to 22 inches—brown, mottled, firm silty clay loam
22 to 33 inches—light brownish gray, mottled, firm silty clay loam
33 to 56 inches—light brownish gray and yellowish brown, mottled, firm and friable silt loam

Substratum:
56 to 60 inches—mottled yellowish brown and light brownish gray, friable silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Stoy soils, which have a dense and brittle layer in the subsoil; in landscape positions similar to those of the Oconee soil
• The poorly drained Weir soils on summits below the Oconee soil

Similar soils:
• Soils that are eroded and have subsoil material mixed in the surface layer
• Soils having a surface layer that is lighter in color
• Soils that have more sand in the lower part of the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table delays planting in some years. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited

to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2w

132A—Starks silt loam, 0 to 2 percent slopes

Composition

Starks and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Interfluves on outwash plains and stream terraces
Landform position: Summits on outwash plains; treads on stream terraces
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 0.5 foot to 2.0 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—brown, friable silt loam

Subsurface layer:
9 to 13 inches—brown, mottled, friable silt loam

Subsoil:
13 to 21 inches—brown, mottled, firm silty clay loam
21 to 30 inches—light brownish gray, mottled, firm silty clay loam
30 to 35 inches—light brownish gray, mottled, firm sandy clay loam
35 to 40 inches—dark yellowish brown, mottled, friable sandy loam

Substratum:
40 to 54 inches—dark yellowish brown, mottled, friable, stratified sandy loam and sandy clay loam
54 to 60 inches—yellowish brown, mottled, friable loam

Inclusions

Contrasting inclusions:
• The well drained Camden soils on summits above the Starks soil
• The poorly drained Drummer soils on summits and toeslopes below the Starks soil

Similar soils:
• Soils that have a darker surface layer
• Soils that have less sand in the lower part of the subsoil
• Soils that have till within a depth of 60 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table delays planting in some years. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited

to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited
Management considerations:
• Planting mature stock and planting on ridges reduce the seedling mortality rate. Some replanting may be necessary.
• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland can reduce the windthrow hazard.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 4A

134A—Camden silt loam, 0 to 2 percent slopes

Composition

Camden and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on outwash plains and stream terraces
Landform position: Summits on outwash plains; treads on stream terraces
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Slow
Available water capacity: High
Depth to the water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—brown, friable silt loam

Subsurface layer:
6 to 10 inches—dark grayish brown, friable silt loam

Subsoil:
10 to 33 inches—yellowish brown, friable silty clay loam
33 to 42 inches—dark yellowish brown, friable clay loam
42 to 52 inches—dark yellowish brown, friable loam

Substratum:
52 to 60 inches—dark yellowish brown, friable sandy loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Starks soils on summits below the Camden soil

Similar soils:
• Soils that have layers of sand and gravel within a depth of 40 inches
• Soils that have more sand in the upper part of the subsoil
• Soils that have less sand in the lower part of the subsoil
• Soils that have a seasonal high water table between the depths of 4 and 6 feet and that are mottled in the lower part of the profile
• Soils that have till within a depth of 60 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- No major limitations affect the use of this soil for crops.
- Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
- Proper stocking rates and rotation grazing help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management considerations:
- Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
- Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Moderately suited to dwellings without basements; well suited to dwellings with basements
Management considerations:
- The shrink-swell potential is a limitation affecting dwellings without basements. Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 1
Woodland ordination symbol: 7A

134B—Camden silt loam, 2 to 5 percent slopes

Composition

Camden and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on outwash plains and stream terraces
Landform position: Summits and backslopes on outwash plains; treads and backslopes on stream terraces
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—brown, friable silt loam

Subsoil:
7 to 10 inches—dark yellowish brown, friable silt loam
10 to 33 inches—yellowish brown, firm silty clay loam
33 to 41 inches—yellowish brown, firm sandy clay loam
41 to 60 inches—yellowish brown, friable sandy loam

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Starks soils on summits below the Camden soil

Similar soils:
- Soils that have layers of sand and gravel within a depth of 40 inches
- Soils that have more sand in the upper part of the subsoil
- Soils that have less sand in the lower part of the subsoil

• Soils that are eroded and have subsoil material mixed in the surface layer
• Soils that have a seasonal high water table between the depths of 4 and 6 feet and that are mottled in the lower part of the profile
• Soils that have till within a depth of 60 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management considerations:
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Moderately suited to dwellings without basements; well suited to dwellings with basements
Management considerations:
• The shrink-swell potential is a limitation affecting dwellings without basements. Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 7A

134C2—Camden silt loam, 5 to 10 percent slopes, eroded

Composition

Camden and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on outwash plains and stream terraces
Landform position: Backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—dark yellowish brown, friable silt loam

Subsoil:
8 to 29 inches—yellowish brown, firm silty clay loam
29 to 39 inches—yellowish brown, friable sandy clay loam
39 to 48 inches—strong brown, very friable sandy loam

Substratum:
48 to 60 inches—strong brown, very friable, stratified sandy loam and loam

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Starks soils on summits below the Camden soil
- Soils that have slopes of more than 10 percent

Similar soils:
- Soils that have layers of sand and gravel within a depth of 40 inches
- Soils that have more sand in the upper part of the subsoil
- Soils that have less sand in the upper part of the subsoil
- Soils that have a seasonal high water table between the depths of 4 and 6 feet and that are mottled in the lower part of the profile
- Soils that have till within a depth of 60 inches

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
- Further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, a rotation that includes 1 or more years of forage crops, contour farming, terraces, or a combination of these practices helps to control erosion.
- Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Maintaining a cover of grasses and legumes reduces the hazard of erosion.
- Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
- Tilling on the contour or using a no-till method for seeding or pasture renovation helps to establish forage species and helps to control erosion.
- Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management considerations:
- Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
- Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Moderately suited to dwellings without basements; well suited to dwellings with basements
Management considerations:
- The shrink-swell potential is a limitation affecting dwellings without basements. Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 3e
Woodland ordination symbol: 7A

148A—Proctor silt loam, 0 to 2 percent slopes

Composition

Proctor and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on outwash plains
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderate
Erosion hazard: Slight

Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 11 inches—very dark grayish brown, friable silt loam

Subsoil:
11 to 15 inches—dark yellowish brown, friable silt loam
15 to 30 inches—yellowish brown, friable silty clay loam
30 to 41 inches—yellowish brown, friable clay loam
41 to 60 inches—mixed dark yellowish brown and yellowish brown, very friable, stratified loam and sandy loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Brenton and Elburn soils on summits below the Proctor soil
• The poorly drained Drummer soils on summits and toeslopes below the Proctor soil

Similar soils:
• Soils that have less sand in the lower part of the subsoil
• Soils that have more sand in the upper part of the subsoil
• Soils that are eroded and have a thinner surface layer
• Soils that have till within a depth of 60 inches
• Soils that have slopes of slightly more than 2 percent

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for crop production.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition.

Dwellings

Suitability: Moderately suited
Management considerations:
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 1

148B—Proctor silt loam, 2 to 5 percent slopes

Composition

Proctor and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on outwash plains
Landform position: Summits and backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown, friable silt loam

Subsurface layer:
9 to 13 inches—very dark grayish brown, friable silt loam

Subsoil:
13 to 25 inches—dark yellowish brown, friable silt loam and firm silty clay loam
25 to 33 inches—dark yellowish brown, firm clay loam
33 to 45 inches—brown, firm sandy loam
45 to 52 inches—brown, friable sandy loam stratified with thin lenses of loamy sand

Substratum:
52 to 60 inches—mixed brown and yellowish brown, very friable sandy loam stratified with thin lenses of loamy sand

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Brenton and Elburn soils on summits below the Proctor soil
• The poorly drained Drummer soils on summits and toeslopes below the Proctor soil

Similar soils:
• Soils that have less sand in the lower part of the subsoil
• Soils that have more sand in the upper part of the subsoil
• Soils that are eroded and have a thinner surface layer and subsurface layer
• Soils that have till within a depth of 60 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e

149A—Brenton silt loam, 0 to 2 percent slopes

Composition

Brenton and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on outwash plains
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: Moderate
Erosion hazard: Slight

Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 10 inches—very dark gray, friable silt loam

Subsurface layer:
10 to 13 inches—very dark gray, friable silt loam

Subsoil:
13 to 17 inches—brown, friable silt loam
17 to 30 inches—brown, mottled, firm silty clay loam
30 to 45 inches—brown, light brownish gray, and yellowish brown, mottled, firm clay loam
45 to 52 inches—dark yellowish brown, mottled, friable, stratified sandy loam and silt loam

Substratum:
52 to 60 inches—mixed strong brown and light gray, mottled, friable, stratified loam and silt loam

Inclusions

Contrasting inclusions:
• The well drained Proctor soils on summits above the Brenton soil
• The poorly drained Drummer soils on summits and toeslopes below the Brenton soil

Similar soils:
• Soils that have till within a depth of 60 inches
• Soils that have less sand in the lower part of the subsoil
• Soils that have a thinner surface layer and subsurface layer
• Soils that have thin strata of gravel in the substratum

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for crop production if surface and subsurface drainage systems are maintained.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• No major limitations affect the use of this soil for pasture and hay if surface and subsurface drainage systems are maintained.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 1

152A—Drummer silty clay loam, 0 to 2 percent slopes

Composition

Drummer and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Interfluves, depressions, and drainageways on outwash plains, ground moraines, and end moraines
Landform position: Summits on interfluves; toeslopes in depressions and drainageways
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Slow to ponded
Available water capacity: Very high
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Ponding duration: Brief
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate

Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—black, friable silty clay loam

Subsurface layer:
7 to 13 inches—black, firm silty clay loam

Subsoil:
13 to 46 inches—gray, mottled, firm silty clay loam
46 to 56 inches—gray, mottled, friable silt loam

Substratum:
56 to 60 inches—gray, mottled, friable, stratified silt loam and loam

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Elburn and Flanagan soils on summits above the Drummer soil
- The moderately well drained Catlin and Dana soils on summits and backslopes above the Drummer soil
- The very poorly drained Peotone soils on toeslopes below the Drummer soil

Similar soils:
- Soils that have more clay in the subsoil
- Soils with black or very dark gray colors that extend to a depth of more than 24 inches
- Soils that have till within a depth of 60 inches
- Soils that are calcareous within a depth of 40 inches
- Soils that have overwash material up to 20 inches thick that is lighter in color and has less clay
- Soils that have less sand in the lower part of the subsoil and in the substratum

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- The seasonal high water table and ponding delay planting in some years. Surface and subsurface drainage systems and land grading help to lower the seasonal high water table and reduce the ponding hazard if suitable outlets are available.
- Tilling when the soil is wet causes surface cloddiness and compaction.
- Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
- The seasonal high water table and ponding of surface water restrict the growth of some forage crops and limit the choice of plants and the period of grazing or cutting. Surface and subsurface drainage systems and land grading help to lower the seasonal high water table and reduce the ponding hazard if suitable outlets are available.
- Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: 2w

153A—Pella silty clay loam, 0 to 2 percent slopes

Composition

Pella and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves, depressions, and drainageways on outwash plains and ground moraines
Landform position: Summits on interfluves; toeslopes in depressions and drainageways
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Slow to ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Ponding duration: Brief
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—black, friable silty clay loam

Subsurface layer:
8 to 12 inches—very dark gray, firm silty clay loam

Subsoil:
12 to 36 inches—dark gray and gray, mottled, firm silty clay loam
36 to 43 inches—gray, mottled, firm, calcareous silt loam
43 to 50 inches—gray, mottled, friable, calcareous silt loam stratified with thin lenses of very fine sandy loam

Substratum:
50 to 60 inches—light gray, mottled, friable, calcareous silt loam stratified with thin lenses of very fine sandy loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Flanagan soils on summits above the Pella soil

Similar soils:
• Soils that are not calcareous within a depth of 40 inches
• Soils with black or very dark gray colors that extend to a depth of more than 24 inches
• Soils that have more clay in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table and ponding delay planting in some years. Surface and subsurface drainage systems and land grading help to lower the seasonal high water table and reduce the ponding hazard if suitable outlets are available.
• Tilling when the soil is wet causes surface cloddiness and compaction.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• The seasonal high water table and ponding of surface water restrict the growth of some forage crops and limit the choice of plants and the period of grazing or cutting. Surface and subsurface drainage systems and land grading help to lower the seasonal high water table and reduce the ponding hazard if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: 2w

154A—Flanagan silt loam, 0 to 2 percent slopes

Composition

Flanagan and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Interfluves on ground moraines
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess and the underlying till
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 11 inches—very dark gray, friable silt loam

Subsurface layer:
11 to 18 inches—very dark gray, friable silty clay loam

Subsoil:
18 to 30 inches—brown, mottled, firm silty clay

30 to 53 inches—brown and grayish brown, mottled, firm silty clay loam
53 to 60 inches—grayish brown, mottled, firm, calcareous clay loam

Inclusions

Contrasting inclusions:
• The moderately well drained Catlin and Dana soils on backslopes and the higher summits
• The poorly drained Drummer soils on summits and toeslopes below the Flanagan soil

Similar soils:
• Soils that have more sand in the upper part of the subsoil
• Soils that have outwash above the till
• Soils that have less clay in the upper part of the subsoil
• Soils that have slopes of slightly more than 2 percent

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for crop production if surface and subsurface drainage systems are maintained.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• No major limitations affect the use of this soil for pasture and hay if surface and subsurface drainage systems are maintained.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.
• Installing subsurface drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 1

164A—Stoy silt loam, 0 to 2 percent slopes

Composition

Stoy and similar soils: 88 to 93 percent
Contrasting inclusions: 7 to 12 percent

Setting

Landform: Interfluves on ground moraines
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow
Parent material: Loess
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—brown, friable silt loam

Subsurface layer:
9 to 14 inches—brown, mottled, friable silt loam

Subsoil:
14 to 20 inches—yellowish brown, friable silty clay loam
20 to 31 inches—yellowish brown, mottled, firm silty clay loam
31 to 49 inches—yellowish brown, mottled, firm, slightly brittle silty clay loam
49 to 60 inches—yellowish brown, mottled, firm, slightly brittle silt loam

Inclusions

Contrasting inclusions:
• The poorly drained Weir soils on summits below the Stoy soil

• The somewhat poorly drained Blair soils on backslopes below the Stoy soil

Similar soils:
• Soils that are not brittle in the lower part of the subsoil
• Soils that have till or outwash within a depth of 60 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table delays planting in some years. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management considerations:
• Planting mature stock and planting on ridges reduce the seedling mortality rate. Some replanting may be necessary.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 4A

164B—Stoy silt loam, 2 to 5 percent slopes

Composition

Stoy and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: Interfluves on ground moraines
Landform position: Summits and backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Slow
Parent material: Loess
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 5 inches—dark grayish brown, friable silt loam

Subsurface layer:
5 to 8 inches—brown, friable silt loam

Subsoil:
8 to 27 inches—yellowish brown, mottled, firm silty clay loam
27 to 40 inches—light brownish gray, mottled, firm silty clay loam
40 to 60 inches—yellowish brown, mottled, firm, slightly brittle silty clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Weir soils on summits below the Stoy soil

• The somewhat poorly drained Atlas and Blair soils on backslopes below the Stoy soil

Similar soils:
• Soils that have slopes of less than 2 percent
• Soils that are not brittle in the lower part of the subsoil
• Soils that have till or outwash within a depth of 60 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
• The seasonal high water table delays planting in some years. Subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management considerations:
• Planting mature stock and planting on ridges reduce the seedling mortality rate. Some replanting may be necessary.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 4A

165A—Weir silt loam, 0 to 2 percent slopes

Composition

Weir and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: Interfluves on ground moraines
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Very slow
Parent material: Loess
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: Less than 1 foot
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—grayish brown, friable silt loam

Subsurface layer:
8 to 18 inches—grayish brown, mottled, friable silt loam

Subsoil:
18 to 60 inches—gray, mottled, firm silty clay loam

Inclusions

Contrasting inclusions:
• The moderately well drained Hosmer soils on summits above the Weir soil
• Poorly drained soils that are subject to ponding; on toeslopes below the Weir soil

Similar soils:
• Soils that have a thicker subsurface layer, which extends to a depth of more than 24 inches
• Soils that have till or outwash within a depth of 60 inches
• Soils that have a seasonal high water table between the depths of 1 and 2 feet, are not mottled, and have browner colors in the subsurface layer and in the upper part of the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• The seasonal high water table delays planting in some years. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• The seasonal high water table restricts the growth of some forage crops and limits the choice of plants and the period of grazing or cutting. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Woodland

Suitability: Poorly suited
Management considerations:
• The seasonal high water limits the use of equipment. Equipment should be used only during periods when the soil is firm.
• Planting mature stock and planting on ridges reduce the seedling mortality rate. Some replanting may be necessary.
• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland can reduce the windthrow hazard.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Poorly suited
Management considerations:
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations helps to lower the water table.
• Elevating the floor of dwellings without basements above the surrounding ground level, grading, and diverting surface water from the site also help to overcome the wetness.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 4W

171B—Catlin silt loam, 2 to 5 percent slopes

Composition

Catlin and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Parent material: Loess and the underlying till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 2.0 to 3.5 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—very dark gray, friable silt loam

Subsurface layer:
9 to 17 inches—very dark grayish brown, friable silt loam

Subsoil:
17 to 28 inches—brown and dark yellowish brown, firm silty clay loam
28 to 46 inches—yellowish brown and light olive brown, mottled, firm silty clay loam
46 to 57 inches—yellowish brown, mottled, firm clay loam and loam

Substratum:
57 to 60 inches—yellowish brown, mottled, firm, calcareous loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils on summits and toeslopes below the Catlin soil
• The somewhat poorly drained Flanagan soils on summits below the Catlin soil

Similar soils:
• Soils that have outwash above the till
• Soils that have more sand in the upper part of the subsoil
• Soils that have a seasonal high water table between the depths of 3.5 and 6.0 feet and are not mottled in the lower part of the subsoil
• Soils that are eroded and have subsoil material mixed in the surface layer
• Soils that have slopes of slightly more than 5 percent

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited to dwellings without basements; poorly suited to dwellings with basements
Management considerations:
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations helps to lower the water table. Wetness is a more severe limitation on sites for dwellings with basements than on sites for dwellings without basements.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e

198A—Elburn silt loam, 0 to 2 percent slopes

Composition

Elburn and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Interfluves on outwash plains
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 10 inches—very dark grayish brown, friable silt loam

Subsurface layer:
10 to 15 inches—very dark grayish brown, friable silt loam

Subsoil:
15 to 21 inches—brown, friable silty clay loam
21 to 25 inches—brown, mottled, firm silty clay loam
25 to 44 inches—yellowish brown, mottled, firm silty clay loam
44 to 51 inches—light brownish gray, mottled, friable silt loam

Substratum:
51 to 60 inches—yellowish brown, mottled, very friable, stratified sandy loam and loamy sand

Inclusions

Contrasting inclusions:
- The well drained Proctor soils on summits above the Elburn soil
- The poorly drained Drummer soils on summits and toeslopes below the Elburn soil

Similar soils:
- Soils that have till within a depth of 60 inches
- Soils that have more sand in the upper part of the subsoil
- Soils that have a thinner surface layer and subsurface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- No major limitations affect the use of this soil for crop production if surface and subsurface drainage systems are maintained.
- Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
- No major limitations affect the use of this soil for pasture and hay if surface and subsurface drainage systems are maintained.
- Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
- Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 1

199B—Plano silt loam, 2 to 5 percent slopes

Composition

Plano and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on outwash plains
Landform position: Summits and backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 10 inches—very dark grayish brown, friable silt loam

Subsurface layer:
10 to 16 inches—very dark grayish brown, friable silt loam

Subsoil:
16 to 20 inches—brown, friable silt loam
20 to 45 inches—dark yellowish brown and yellowish brown, friable silty clay loam
45 to 55 inches—strong brown, friable clay loam
55 to 60 inches—strong brown, friable sandy clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils on summits and toeslopes below the Plano soil
• The somewhat poorly drained Brenton and Elburn soils on summits below the Plano soil

Similar soils:
• Soils that have till within a depth of 60 inches
• Soils that have more sand in the upper part of the subsoil
• Soils that have a seasonal high water table between the depths of 4 and 6 feet and are mottled
• Soils that have slopes of less than 2 percent

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e

208A—Sexton silt loam, 0 to 2 percent slopes

Composition

Sexton and similar soils: 85 to 95 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Interfluves on outwash plains
Landform position: Summits

Major use: Cropland

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Slow
Parent material: Loess and the underlying outwash
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: Less than 1 foot
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—grayish brown, friable silt loam

Subsurface layer:
8 to 12 inches—gray, mottled, friable silt loam

Subsoil:
12 to 16 inches—grayish brown, mottled, firm silty clay loam
16 to 36 inches—gray, mottled, firm silty clay and silty clay loam
36 to 45 inches—light brownish gray, mottled, firm, stratified silty clay loam and clay loam

Substratum:
45 to 60 inches—mixed light brownish gray and yellowish brown, mottled, firm, stratified clay loam and sandy loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Kendall and Starks soils on summits above the Sexton soil

Similar soils:
• Soils that have a seasonal high water table at a depth of 1 to 2 feet, are not mottled, and have browner colors in the upper part of the subsoil
• Soils that have less clay in the subsoil
• Soils that have a darker surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table delays planting in some years. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• The seasonal high water table restricts the growth of some forage crops and limits the choice of plants and the period of grazing or cutting. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Woodland

Suitability: Poorly suited
Management considerations:
• The seasonal high water table limits the use of equipment. Equipment should be used only during periods when the soil is firm.
• Planting mature stock and planting on ridges reduce the seedling mortality rate. Some replanting may be necessary.
• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland can reduce the windthrow hazard.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Poorly suited
Management considerations:
• Reinforcing the foundations and extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations helps to lower the water table.
• Elevating the floor of dwellings without basements above the surrounding ground level, grading, and

diverting surface water from the site also help to overcome the wetness.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 4W

214B—Hosmer silt loam, 2 to 5 percent slopes

Composition

Hosmer and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on ground moraines
Landform position: Summits and backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate in the upper part and very slow in the lower part
Parent material: Loess
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: 1.5 to 3.0 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 4 inches—dark brown, friable silt loam

Subsurface layer:
4 to 10 inches—yellowish brown, friable silt loam

Subsoil:
10 to 31 inches—yellowish brown, friable and firm silty clay loam
31 to 38 inches—yellowish brown, mottled, firm silty clay loam
38 to 60 inches—yellowish brown, mottled, firm, brittle silt loam

Inclusions

Contrasting inclusions:
- The poorly drained Weir soils on summits below the Hosmer soil
- The well drained Hickory soils on steep and very steep backslopes below the Hosmer soil
- Soils that have slopes of more than 5 percent, are severely eroded, and have a surface layer of silty clay loam

Similar soils:
- Soils that have more sand in the lower part of the subsoil
- Soils that do not have a brittle layer in the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
- A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
- The moderate available water capacity is a limitation. Leaving crop residue on the surface after planting and returning crop residue to the soil or regularly adding other organic material conserve soil moisture. These practices also help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Maintaining a cover of grasses and legumes reduces the hazard of erosion.
- Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
- Tilling on the contour for seeding and pasture renovation helps to establish forage species and helps to control erosion.
- Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management considerations:
- Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
- Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots,

and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Moderately suited to dwellings without basements; poorly suited to dwellings with basements
Management considerations:
• Reinforcing foundations and extending the footings below the subsoil help to minimize the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations helps to lower the water table. Wetness is a more severe limitation on sites for dwellings with basements than on sites for dwellings without basements.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 4A

219A—Millbrook silt loam, 0 to 2 percent slopes

Composition

Millbrook and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on outwash plains
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 0.5 foot to 2.0 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown, friable silt loam

Subsurface layer:
9 to 14 inches—brown, mottled, friable silt loam

Subsoil:
14 to 28 inches—light brownish gray, mottled, firm silty clay loam
28 to 41 inches—light brownish gray, mottled, firm clay loam
41 to 49 inches—yellowish brown, mottled, very friable, stratified sandy loam and loamy sand

Substratum:
49 to 60 inches—light brownish gray, mottled, friable, stratified silt loam and loamy sand

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils on summits and toeslopes below the Millbrook soil
• The well drained Camden soils on summits and backslopes above the Millbrook soil

Similar soils:
• Soils that have till within a depth of 60 inches
• Soils that have less sand in the upper part of the subsoil
• Soils that have a thicker dark surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• No major limitations affect the use of this soil for crop production if surface and subsurface drainage systems are maintained.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• No major limitations affect the use of this soil for pasture and hay if surface and subsurface drainage systems are maintained.

• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 1

242A—Kendall silt loam, 0 to 2 percent slopes

Composition

Kendall and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on outwash plains and stream terraces
Landform position: Summits on outwash plains; treads on stream terraces
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 0.5 foot to 2.0 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—dark grayish brown, friable silt loam

Subsurface layer:
9 to 12 inches—brown, mottled, friable silt loam

Subsoil:
12 to 17 inches—brown, mottled, firm silty clay loam
17 to 42 inches—light brownish gray, mottled, firm silty clay loam
42 to 54 inches—light brownish gray, mottled, friable silt loam

Substratum:
54 to 60 inches—gray, mottled, friable sandy clay loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils on summits and toeslopes below the Kendall soil
• The well drained Camden soils on summits and backslopes above the Kendall soil

Similar soils:
• Soils that have more sand in the upper part of the subsoil
• Soils that have more clay in the subsoil
• Soils that have less sand in the lower part of the subsoil and in the substratum

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table delays planting in some years. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited

Management considerations:
• Planting mature stock and planting on ridges reduce the seedling mortality rate. Some replanting may be necessary.
• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland can reduce the windthrow hazard.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 4A

243B—St. Charles silt loam, 2 to 5 percent slopes

Composition

St. Charles and similar soils: 92 to 96 percent
Contrasting inclusions: 4 to 8 percent

Setting

Landform: Interfluves on outwash plains and stream terraces
Landform position: Summits and backslopes on outwash plains; treads and backslopes on stream terraces
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—brown, friable silt loam

Subsurface layer:
7 to 10 inches—brown, friable silt loam

Subsoil:
10 to 16 inches—dark yellowish brown, firm silt loam
16 to 50 inches—dark yellowish brown and yellowish brown, firm silty clay loam
50 to 60 inches—yellowish brown, firm sandy clay loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Kendall soils on summits below the St. Charles soil

Similar soils:
• Soils that have more sand in the upper part of the subsoil
• Soils that have till within a depth of 60 inches
• Soils that have a seasonal high water table between the depths of 4 and 6 feet and are mottled in the lower part of the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red

clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management considerations:
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Moderately suited
Management considerations:
• Reinforcing foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 7A

291B—Xenia silt loam, 2 to 5 percent slopes

Composition

Xenia and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderately slow
Parent material: Loess and the underlying till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 1.5 to 3.0 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—brown, friable silt loam

Subsoil:
7 to 18 inches—yellowish brown, mottled, friable silty clay loam
18 to 34 inches—yellowish brown, mottled, firm silty clay loam
34 to 46 inches—yellowish brown, mottled, firm clay loam
46 to 52 inches—yellowish brown, mottled, firm, calcareous clay loam

Substratum:
52 to 60 inches—yellowish brown, mottled, firm, calcareous loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils on summits and toeslopes below the Xenia soil
• The somewhat poorly drained Fincastle soils on summits below the Xenia soil

Similar soils:
• Soils that have outwash above the till
• Soils that are eroded and have subsoil material mixed in the surface layer

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management considerations:
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Moderately suited to dwellings without basements; poorly suited to dwellings with basements
Management considerations:
• Reinforcing the foundations and extending the footings below the subsoil help to minimize the structural damage caused by shrinking and swelling.
• Installing subsurface tile drains near the foundations helps to lower the water table. Wetness is a more severe limitation on sites for dwellings with basements than on sites for dwellings without basements.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 5A

322B—Russell silt loam, 2 to 5 percent slopes

Composition

Russell and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Loess and the underlying till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 6 inches—brown, friable silt loam

Subsurface layer:
6 to 13 inches—yellowish brown, friable silt loam

Subsoil:
13 to 28 inches—dark yellowish brown, firm silty clay loam
28 to 47 inches—dark yellowish brown, firm clay loam

Substratum:
47 to 60 inches—yellowish brown, firm, calcareous loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils on summits and toeslopes below the Russell soil
• The somewhat poorly drained Fincastle soils on summits below the Russell soil

Similar soils:
• Soils that are eroded and have subsoil material mixed in the surface layer
• Soils that have outwash above the till

• Soils that have less sand in the lower part of the subsoil
• Soils that have a seasonal high water table between the depths of 4 and 6 feet and are mottled in the lower part of the subsoil and in the substratum

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management considerations:
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Moderately suited
Management considerations:
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 5A

322C2—Russell silt loam, 5 to 10 percent slopes, eroded

Composition

Russell and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on end moraines and ground moraines
Landform position: Backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Loess and the underlying till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 7 inches—brown, friable silt loam

Subsoil:
7 to 13 inches—yellowish brown, friable silty clay loam
13 to 27 inches—yellowish brown, firm silty clay loam
27 to 56 inches—yellowish brown and strong brown, firm clay loam

Substratum:
56 to 60 inches—yellowish brown, firm, calcareous loam

Inclusions

Contrasting inclusions:
- The poorly drained Drummer soils on summits and toeslopes below the Russell soil
- The somewhat poorly drained Fincastle soils on summits below the Russell soil

Similar soils:
- Soils that have more sand in the upper part of the subsoil
- Soils that have a seasonal high water table between the depths of 4 and 6 feet and are mottled in the lower part of the subsoil and in the substratum

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
- Further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, a rotation that includes 1 or more years of forage crops, contour farming, terraces, or a combination of these practices helps to control erosion.
- Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Maintaining a cover of grasses and legumes reduces the hazard of erosion.
- Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
- Tilling on the contour or using a no-till method for seeding or pasture renovation helps to establish forage species and helps to control erosion.
- Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management considerations:
- Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
- Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Moderately suited
Management considerations:
- Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 3e
Woodland ordination symbol: 5A

330A—Peotone silty clay loam, 0 to 2 percent slopes

Composition

Peotone and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: Interfluves, depressions, and drainageways on outwash plains and ground moraines
Landform position: Summits on interfluves; toeslopes in depressions and drainageways
Major use: Cropland

Soil Properties and Qualities

Drainage class: Very poorly drained
Permeability: Moderately slow
Parent material: Loess or silty colluvium
Runoff: Very slow or ponded
Available water capacity: High
Seasonal high water table: 0.5 foot above to 1.0 foot below the surface
Ponding duration: Brief
Organic matter content: High
Hazard of soil blowing: Moderate
Shrink-swell potential: High
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—very dark gray, firm silty clay loam

Subsurface layer:
8 to 12 inches—very dark gray, firm silty clay loam

Subsoil:
12 to 21 inches—black, very firm silty clay
21 to 33 inches—black, mottled, very firm silty clay
33 to 49 inches—grayish brown and olive gray, mottled, firm, calcareous silty clay loam

Substratum:
49 to 60 inches—olive gray, mottled, firm, calcareous silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Flanagan and Raub soils on summits above the Peotone soil
• Soils that are subject to ponding for long or very long periods

Similar soils:
• Soils that have less than 24 inches of very dark gray or black in the upper part of the profile
• Soils that have clay in the subsoil
• Soils that have more sand in the lower part of the subsoil
• Soils that are calcareous within a depth of 30 inches

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table and ponding delay planting in some years. Surface and subsurface drainage systems and land grading help to lower the seasonal high water table and reduce the ponding hazard if suitable outlets are available.
• Soil blowing is a moderate hazard. Using a system of conservation tillage, such as no-till or mulch till, that leaves crop residue on the surface after planting, planting at right angles to the prevailing winds, avoiding fall tillage, planting cover crops, and establishing field windbreaks help to control soil blowing.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• The seasonal high water table and ponding of surface water restrict the growth of some forage crops and limit the choice of plants and the period of grazing or cutting. Surface and subsurface drainage systems and land grading help to lower the seasonal high water table and reduce the ponding hazard if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Generally unsuited because of the ponding

Septic tank absorption fields

Suitability: Generally unsuited because of the ponding

Interpretive Groups

Land capability classification: 2w

344B—Harvard silt loam, 2 to 5 percent slopes

Composition

Harvard and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on outwash plains
Landform position: Summits and backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Loess and the underlying outwash
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown, friable silt loam

Subsoil:

9 to 26 inches—dark yellowish brown, friable and firm silty clay loam
26 to 31 inches—dark yellowish brown, firm clay loam
31 to 38 inches—yellowish brown, very friable sandy loam

Substratum:

38 to 60 inches—mixed brownish yellow and dark yellowish brown, loose, stratified sandy loam and loamy sand

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Millbrook and Virgil soils on summits below the Harvard soil
- The poorly drained Drummer soils on summits and toeslopes below the Harvard soil

Similar soils:

- Soils having a surface layer that is lighter in color
- Soils that have till within a depth of 60 inches
- Soils that have a seasonal high water table between the depths of 4 and 6 feet and are mottled in the lower part of the subsoil and in the substratum

Use and Management

Cropland

Suitability: Well suited
Management considerations:

- A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
- Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:

- Maintaining a cover of grasses and legumes reduces the hazard of erosion.
- Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
- Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
- Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited
Management considerations:

- Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:

- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e

348B—Wingate silt loam, 2 to 5 percent slopes

Composition

Wingate and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderately slow
Parent material: Loess and the underlying till
Runoff: Medium
Available water capacity: High
Depth to the seasonal high water table: 1.5 to 3.0 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:

0 to 9 inches—very dark grayish brown, friable silt loam

Subsurface layer:

9 to 12 inches—brown, friable silt loam

Subsoil:

12 to 27 inches—yellowish brown, firm silty clay loam

27 to 52 inches—yellowish brown, mottled, firm clay loam

Substratum:
52 to 60 inches—yellowish brown, firm, calcareous loam

Inclusions

Contrasting inclusions:
- The poorly drained Drummer soils on summits and toeslopes below the Wingate soil
- The somewhat poorly drained Flanagan soils on summits below the Wingate soil

Similar soils:
- Soils that have more sand in the upper part of the subsoil
- Soils that have less sand in the lower part of the subsoil
- Soils that have outwash above the till

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
- Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Maintaining a cover of grasses and legumes reduces the hazard of erosion.
- Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
- Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
- Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited to dwellings without basements; poorly suited to dwellings with basements
Management considerations:
- Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.
- Installing subsurface tile drains near the foundations helps to lower the water table. Wetness is a more severe limitation on sites for dwellings with basements than on sites for dwellings without basements.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e

353A—Toronto silt loam, 0 to 2 percent slopes

Composition

Toronto and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Interfluves on end moraines and ground moraines
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess and the underlying till
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 0.5 foot to 2.0 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—very dark grayish brown, friable silt loam

Subsurface layer:
9 to 12 inches—brown, mottled, friable silt loam

Subsoil:
12 to 26 inches—grayish brown and light brownish gray, mottled, firm silty clay loam

26 to 44 inches—light brownish gray and yellowish brown, mottled, firm clay loam
44 to 54 inches—yellowish brown, mottled, firm loam

Substratum:
54 to 60 inches—yellowish brown, mottled, firm, calcareous loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils on summits and toeslopes below the Toronto soil

Similar soils:
• Soils having a surface layer that is lighter in color
• Soils that have a thicker surface layer
• Soils that have outwash above the till
• Soils that have more clay in the subsoil
• Soils that have less sand in the lower part of the subsoil
• Soils that are slightly deeper to the seasonal high water table and are brown in the upper part of the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table delays planting in some years. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2w

481A—Raub silt loam, 0 to 2 percent slopes

Composition

Raub and similar soils: 94 to 98 percent
Contrasting inclusions: 2 to 6 percent

Setting

Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Parent material: Loess and the underlying till
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—black, very friable silt loam

Subsurface layer:
9 to 16 inches—very dark grayish brown, friable silt loam

Subsoil:
16 to 31 inches—brown, mottled, firm silty clay loam
31 to 52 inches—grayish brown, mottled, firm silty clay loam

52 to 60 inches—grayish brown, mottled, firm loam

Inclusions

Contrasting inclusions:
- The moderately well drained Dana soils on summits and backslopes above the Raub soil
- The poorly drained Drummer soils on summits and toeslopes below the Raub soil

Similar soils:
- Soils that have outwash above the till
- Soils that have more clay in the subsoil
- Soils that have less sand in the lower part of the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
- The seasonal high water table delays planting in some years. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
- Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
- Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
- Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Dwellings

Suitability: Poorly suited
Management considerations:
- Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2w

496A—Fincastle silt loam, 0 to 2 percent slopes

Composition

Fincastle and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: Interfluves on end moraines and ground moraines
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Loess and the underlying till
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 0.5 foot to 2.0 feet
Organic matter content: Moderately low
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 9 inches—brown, very friable silt loam

Subsurface layer:
9 to 14 inches—light brownish gray, mottled, friable silt loam

Subsoil:
14 to 34 inches—dark yellowish brown and yellowish brown, mottled, firm silty clay loam
34 to 47 inches—yellowish brown, mottled, firm clay loam
47 to 60 inches—yellowish brown, mottled, friable loam

Inclusions

Contrasting inclusions:
- The poorly drained Drummer soils on summits and toeslopes below the Fincastle soil
- The moderately well drained Xenia soils on backslopes and summits above the Fincastle soil

Similar soils:
- Soils that have a darker surface layer

• Soils that have less sand in the lower part of the subsoil
• Soils that are slightly wetter and have grayer colors in the subsoil

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• The seasonal high water table delays planting in some years. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited
Management considerations:
• Planting mature stock and planting on ridges reduce the seedling mortality rate. Some replanting may be necessary.
• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland can reduce the windthrow hazard.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Poorly suited
Management considerations:
• Installing subsurface tile drains near the foundations helps to lower the water table.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 4A

551F—Gosport silt loam, 18 to 35 percent slopes

Composition

Gosport and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: End moraines and ground moraines
Landform position: Backslopes
Major use: Woodland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Very slow
Parent material: Till and the underlying shale residuum
Runoff: Rapid
Available water capacity: Low
Depth to the seasonal high water table: 1.5 to 3.0 feet
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 4 inches—dark grayish brown, friable silt loam

Subsoil:
4 to 12 inches—brown, firm clay
12 to 26 inches—brown, mottled, firm silty clay and very firm clay

Substratum:
26 to 60 inches—brown and gray, weathered shale bedrock

Inclusions

Contrasting inclusions:
- The well drained Genesee and Stonelick soils and the somewhat poorly drained Shoals soils on flood plains
- The well drained Russell soils and the moderately well drained Xenia soils, which are very deep to bedrock; on summits above the Gosport soil

Similar soils:
- Soils that are slightly deeper or shallower to bedrock

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Poorly suited
Management considerations:
- Maintaining a cover of grasses and legumes reduces the hazard of erosion.
- Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
- Using a no-till method for seeding or pasture renovation helps to establish forage species and helps to control erosion. The use of machinery is limited because of the slope.
- Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Poorly suited
Management considerations:
- Because of the slope, erosion is a hazard and the use of machinery is limited.
- Establishing logging roads and skid trails on or near the contour and seeding bare areas to grass or to a grass-legume mixture after logging has been completed reduce the hazard of erosion.
- Logs or trees should be skidded uphill with a cable and winch.
- Grass firebreaks can be used in areas of this soil.
- Seedling mortality is high because of the low available water capacity. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings reduce the seedling mortality rate. Some replanting may be necessary.
- Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland can help to overcome the windthrow hazard.
- Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
- Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the depth to bedrock and the slope

Interpretive Groups

Land capability classification: 7e
Woodland ordination symbol: 2R

551G—Gosport loam, 35 to 50 percent slopes

Composition

Gosport and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: End moraines and ground moraines
Landform position: Backslopes
Major use: Woodland

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Very slow
Parent material: Till and the underlying shale residuum
Runoff: Rapid
Available water capacity: Low
Depth to the seasonal high water table: 1.5 to 3.0 feet
Depth to bedrock: 20 to 40 inches
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: High
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 4 inches—very dark grayish brown, friable loam

Subsoil:
4 to 13 inches—dark yellowish brown, friable clay loam

13 to 25 inches—brown, olive gray, and yellowish brown, firm silty clay loam

Substratum:

25 to 60 inches—olive gray and dark yellowish brown, weathered shale bedrock

Inclusions

Contrasting inclusions:

- The well drained Genesee and Stonelick soils on flood plains
- The somewhat poorly drained Shoals soils on flood plains
- The well drained Russell soils and the moderately well drained Xenia soils, which are very deep to bedrock; on summits above the Gosport soil
- Exposures of shale or limestone bedrock on nearly vertical escarpments

Similar soils:

- Soils that are slightly deeper or shallower to bedrock
- Soils that have slopes of more than 50 percent

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Generally unsuited because of the slope

Woodland

Suitability: Poorly suited
Management considerations:

- Because of the slope, erosion is a hazard and the use of machinery is limited.
- Establishing logging roads and skid trails on or near the contour and seeding bare areas to grass or to a grass-legume mixture after logging has been completed reduce the hazard of erosion.
- Logs or trees should be skidded uphill with a cable and winch.
- Grass firebreaks can be used in areas of this soil.
- Seedling mortality is high because of the low available water capacity. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings reduce the seedling mortality rate. Some replanting may be necessary.
- Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland can reduce the windthrow hazard.
- Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
- Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the depth to bedrock and the slope

Interpretive Groups

Land capability classification: 7e
Woodland ordination symbol: 2R

570B2—Martinsville loam, 2 to 5 percent slopes, eroded

Composition

Martinsville and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: Outwash plains and stream terraces
Landform position: Backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Outwash
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 8 inches—brown, friable loam

Subsoil:

8 to 21 inches—dark yellowish brown and yellowish brown, firm clay loam
21 to 36 inches—yellowish brown, firm sandy clay loam

36 to 48 inches—yellowish brown, friable sandy loam

Substratum:

48 to 60 inches—yellowish brown, friable, stratified sandy loam and loam

Inclusions

Contrasting inclusions:

- The somewhat poorly drained Kendall and Starks soils on summits and treads above the Martinsville soil

Similar soils:

- Soils that have less sand in the surface layer and the upper part of the subsoil
- Soils that have till within a depth of 60 inches
- Soils that have gravelly textures in the substratum
- Soils that have less clay and more sand throughout

Use and Management

Cropland

Suitability: Well suited
Management considerations:

- Further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
- Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:

- Maintaining a cover of grasses and legumes reduces the hazard of erosion.
- Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
- Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
- Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management considerations:

- Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
- Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Well suited
Management considerations:

- No major limitations affect the use of this soil as a site for dwellings.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:

- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e
Woodland ordination symbol: 4A

618C2—Senachwine silt loam, 5 to 10 percent slopes, eroded

Composition

Senachwine and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: End moraines and ground moraines
Landform position: Backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Loess and the underlying till
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:

0 to 8 inches—mixed brown and yellowish brown, friable silt loam

Subsoil:

8 to 12 inches—yellowish brown, firm silty clay loam
12 to 36 inches—yellowish brown, firm clay loam

Substratum:
36 to 60 inches—yellowish brown, very firm, calcareous loam

Inclusions

Contrasting inclusions:
- The poorly drained Drummer soils on summits and toeslopes
- The somewhat poorly drained Fincastle soils on summits
- Soils that have slopes between 10 and 18 percent

Similar soils:
- Soils that are deeper to calcareous till
- Soils that have outwash above the till
- Soils that have gravelly textures in the substratum

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
- Further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, a rotation that includes 1 or more years of forage crops, contour farming, terraces, or a combination of these practices helps to control erosion.
- The moderate available water capacity is a limitation. Leaving crop residue on the surface after planting and returning crop residue to the soil or regularly adding other organic material conserve soil moisture. These practices also help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Maintaining a cover of grasses and legumes reduces the hazard of erosion.
- Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
- Tilling on the contour or using a no-till method for seeding or pasture renovation helps to establish forage species and helps to control erosion.
- Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management considerations:
- Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
- Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Moderately suited to dwellings without basements; well suited to dwellings with basements
Management considerations:
- The shrink-swell potential is a limitation affecting dwellings without basements. Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 3e
Woodland ordination symbol: 5A

618C3—Senachwine clay loam, 5 to 10 percent slopes, severely eroded

Composition

Senachwine and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: End moraines and ground moraines
Landform position: Backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Till
Runoff: Medium
Available water capacity: Low
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: Moderate

Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 7 inches—dark yellowish brown, firm clay loam

Subsoil:
7 to 28 inches—dark yellowish brown and yellowish brown, firm clay loam
28 to 33 inches—yellowish brown, friable, calcareous loam

Substratum:
33 to 60 inches—brown, firm, calcareous loam

Inclusions

Contrasting inclusions:
- The poorly drained Drummer soils on summits and toeslopes below the Senachwine soil
- The somewhat poorly drained Fincastle soils on summits above the Senachwine soil
- Soils that have slopes between 10 and 18 percent

Similar soils:
- Soils that are deeper to calcareous till
- Soils that have outwash above the till
- Soils that are less eroded and have a surface layer of silt loam
- Soils that have less sand in the upper part of the subsoil

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
- Further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, a rotation that is dominated by forage crops, terraces, contour farming, or a combination of these practices helps to control erosion.
- Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion.
- The low available water capacity is a limitation. Leaving crop residue on the surface after planting and returning crop residue to the soil or regularly adding other organic material conserve soil moisture. These practices also help to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Management considerations:
- Maintaining a cover of grasses and legumes reduces the hazard of erosion.
- Smooth bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
- Preparing a good seedbed is difficult in areas of severely eroded soils because of the tendency of the surface layer to become cloddy. Using a no-till method of seeding or pasture renovation helps to establish forage species and helps to control erosion.
- Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited to dwellings without basements; well suited to dwellings with basements
Management considerations:
- The shrink-swell potential is a limitation affecting dwellings without basements. Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 4e

618D2—Senachwine silt loam, 10 to 18 percent slopes, eroded

Composition

Senachwine and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: End moraines and ground moraines
Landform position: Backslopes
Major use: Pasture and hay

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Till
Runoff: Rapid
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet

Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 8 inches—dark yellowish brown, friable silt loam

Subsoil:
8 to 37 inches—yellowish brown, firm clay loam

Substratum:
37 to 60 inches—yellowish brown, firm, calcareous loam

Inclusions

Contrasting inclusions:
• The well drained Genesee and Stonelick soils on flood plains
• The somewhat poorly drained Shoals soils on flood plains

Similar soils:
• Soils that are deeper to calcareous till
• Soils that have pockets of outwash material within the till

Use and Management

Cropland

Suitability: Poorly suited
Management considerations:
• Further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, a rotation dominated by forage crops, contour farming, terraces, or a combination of these practices helps to control erosion.
• The moderate available water capacity is a limitation. Leaving crop residue on the surface after planting and returning crop residue to the soil or regularly adding other organic material conserve soil moisture. These practices also help to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour or using a no-till method for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Well suited
Management considerations:
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Moderately suited
Management considerations:
• Land shaping by cutting and filling helps to overcome the slope.
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 4e
Woodland ordination symbol: 5A

618D3—Senachwine clay loam, 10 to 18 percent slopes, severely eroded

Composition

Senachwine and similar soils: 90 to 98 percent
Contrasting inclusions: 2 to 10 percent

Setting

Landform: End moraines and ground moraines
Landform position: Backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow

Parent material: Till
Runoff: Rapid
Available water capacity: Low
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 6 inches—yellowish brown, firm clay loam

Subsoil:
6 to 21 inches—yellowish brown, firm clay loam
21 to 34 inches—strong brown, firm, calcareous loam

Substratum:
34 to 60 inches—yellowish brown, firm, calcareous loam

Inclusions

Contrasting inclusions:
• The moderately well drained Xenia soils on summits above the Senachwine soil

Similar soils:
• Soils that are deeper to calcareous till
• Soils that are less eroded and have a surface layer of silt loam

Use and Management

Cropland

Suitability: Generally unsuited because of the slope and the severe hazard of erosion

Pasture and hay

Suitability: Poorly suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Preparing a good seedbed is difficult in areas of severely eroded soils because of the tendency of the surface layer to become cloddy. Using a no-till method for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Land shaping by cutting and filling helps to overcome the slope.
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 6e

618F—Senachwine loam, 18 to 35 percent slopes

Composition

Senachwine and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: End moraines and ground moraines
Landform position: Backslopes
Major use: Woodland (fig. 11)

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Till
Runoff: Rapid
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 3 inches—very dark grayish brown, friable loam

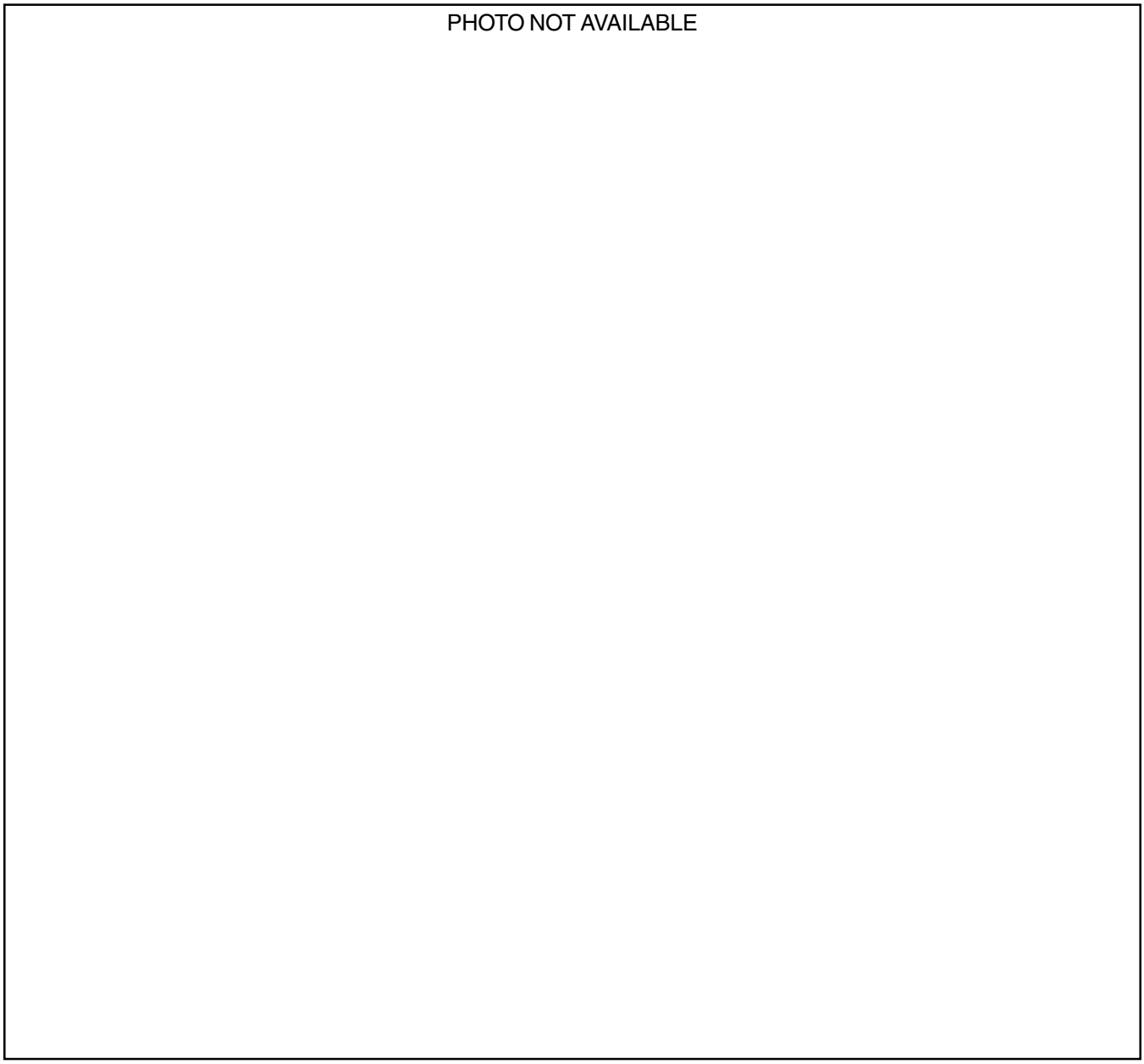

Figure 11.—Most areas of Senachwine loam, 18 to 35 percent slopes, are used as woodland.

Subsurface layer:
3 to 8 inches—brown, very friable loam

Subsoil:
8 to 28 inches—yellowish brown and brown, firm clay loam
28 to 34 inches—yellowish brown, very firm, calcareous clay loam

Substratum:
34 to 60 inches—yellowish brown, very firm, calcareous loam

Inclusions

Contrasting inclusions:
- The well drained Genesee and Stonelick soils on flood plains
- The somewhat poorly drained Shoals soils on flood plains
- The well drained Russell soils on summits above the Senachwine soil

Similar soils:
- Soils that are deeper to calcareous till

• Soils that have pockets of outwash material within the till
• Soils that have less sand in the surface layer and subsurface layer and in the upper part of the subsoil

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Poorly suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Using a no-till method for seeding or pasture renovation helps to establish forage species and helps to control erosion. The use of machinery is limited because of the slope.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Woodland

Suitability: Moderately suited
Management considerations:
• Because of the slope, erosion is a hazard and the use of equipment is limited.
• Establishing logging roads and skid trails on or near the contour and seeding bare areas to grass or to a grass-legume mixture after logging has been completed reduce the hazard of erosion.
• Logs or trees should be skidded uphill with a cable and winch.
• Grass firebreaks can be used in areas of this soil.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: 6e

Woodland ordination symbol: 5R

618G—Senachwine loam, 35 to 60 percent slopes

Composition

Senachwine and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: End moraines and ground moraines
Landform position: Backslopes
Major use: Woodland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Till
Runoff: Rapid
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 5 inches—very dark grayish brown, friable loam

Subsurface layer:
5 to 9 inches—brown, friable loam

Subsoil:
9 to 38 inches—brown and dark yellowish brown, firm clay loam

Substratum:
38 to 60 inches—yellowish brown, firm, calcareous loam

Inclusions

Contrasting inclusions:
• The well drained Genesee and Stonelick soils on flood plains
• The somewhat poorly drained Shoals soils on flood plains
• The moderately well drained Gosport soils, which are moderately deep to bedrock; in landscape positions similar to those of the Senachwine soil or on the lower parts of backslopes below the Senachwine soil

Similar soils:
- Soils that are deeper to calcareous till
- Soils that have pockets of outwash material within the till

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Generally unsuited because of the slope

Woodland

Suitability: Poorly suited
Management considerations:
- Because of the slope, erosion is a hazard and the use of equipment is limited.
- Establishing logging roads and skid trails on or near the contour and seeding bare areas to grass or to a grass-legume mixture after logging has been completed reduce the hazard of erosion.
- Logs or trees should be skidded uphill with a cable and winch.
- Grass firebreaks can be used in areas of this soil.
- Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
- Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: 7e
Woodland ordination symbol: 5R

622B2—Wyanet silt loam, 2 to 5 percent slopes, eroded

Composition

Wyanet and similar soils: 95 to 98 percent
Contrasting inclusions: 2 to 5 percent

Setting

Landform: End moraines and ground moraines
Landform position: Backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Till
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderate
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 6 inches—very dark grayish brown, friable silt loam

Subsurface layer:
6 to 10 inches—mixed very dark grayish brown and yellowish brown, firm silty clay loam

Subsoil:
10 to 30 inches—yellowish brown, firm clay loam
30 to 36 inches—yellowish brown, firm loam

Substratum:
36 to 60 inches—light yellowish brown, very firm, calcareous loam

Inclusions

Contrasting inclusions:
- The poorly drained Drummer soils on summits and toeslopes
- The somewhat poorly drained Raub soils on summits

Similar soils:
- Soils that are less eroded and have a thicker surface layer
- Soils that are severely eroded and have a surface layer of clay loam
- Soils that have pockets of outwash material within the till
- Soils that have less sand in the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
- Further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
- The moderate available water capacity is a limitation.

Leaving crop residue on the surface after planting and returning crop residue to the soil or regularly adding other organic material conserve soil moisture. These practices also help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited to dwellings without basements; well suited to dwellings with basements
Management considerations:
• The shrink-swell potential is a limitation affecting dwellings without basements. Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e

622C2—Wyanet silt loam, 5 to 10 percent slopes, eroded

Composition

Wyanet and similar soils: 88 to 98 percent
Contrasting inclusions: 2 to 12 percent

Setting

Landform: End moraines and ground moraines
Landform position: Backslopes
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Till
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderate
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 6 inches—mixed dark brown and dark yellowish brown, friable silt loam

Subsoil:
6 to 32 inches—dark yellowish brown and yellowish brown, firm clay loam

Substratum:
32 to 60 inches—yellowish brown, firm, calcareous loam

Inclusions

Contrasting inclusions:
• The poorly drained Drummer soils on summits and toeslopes
• The somewhat poorly drained Raub soils on summits

Similar soils:
• Soils that are less eroded and have a thicker surface layer
• Soils that are severely eroded and have a surface layer of clay loam
• Soils that have pockets of outwash material within the till
• Soils that have less sand in the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• Further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, a rotation that includes 1 or more years of forage crops, contour farming, terraces, or a combination of these practices helps to control erosion.
• The moderate available water capacity is a limitation. Leaving crop residue on the surface after planting and returning crop residue to the soil or regularly adding

other organic material conserve soil moisture. These practices also help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
- Maintaining a cover of grasses and legumes reduces the hazard of erosion.
- Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
- Tilling on the contour or using a no-till method for seeding or pasture renovation helps to establish forage species and helps to control erosion.
- Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited to dwellings without basements; well suited to dwellings with basements
Management considerations:
- The shrink-swell potential is a limitation affecting dwellings without basements. Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 3e

809F—Orthents, loamy-skeletal, acid, steep

Composition

Orthents and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Setting

Landform: Ground moraines
Landform position: Backslopes
Slope range: 20 to 60 percent
Major uses: Idle land or paths and trails (fig. 12)

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Mine spoil
Runoff: Rapid
Available water capacity: Low
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Low
Erosion hazard: Severe
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 3 inches—mixed brown, light olive brown, and grayish brown, friable loam

Substratum:
3 to 60 inches—mixed light brownish gray, yellowish brown, light gray, and dark gray, friable to extremely firm very channery clay loam

Inclusions

Contrasting inclusions:
- The well drained Genesee and Stonelick soils on flood plains
- The well drained Camden and Senachwine soils on adjacent backslopes in areas that have not been disturbed by mining activities
- Deposits of mine spoil that are subject to flooding or ponding
- Intermittent and perennial bodies of water

Similar soils:
- Soils that have slopes of less than 20 percent or more than 60 percent
- Soils that contain fewer channers in the substratum

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Generally unsuited because of the slope

Recreation

Suitability: Poorly suited
Management considerations:
- Covering paths and trails with a mulch helps to control erosion.
- Grading and land shaping can reduce the slope.

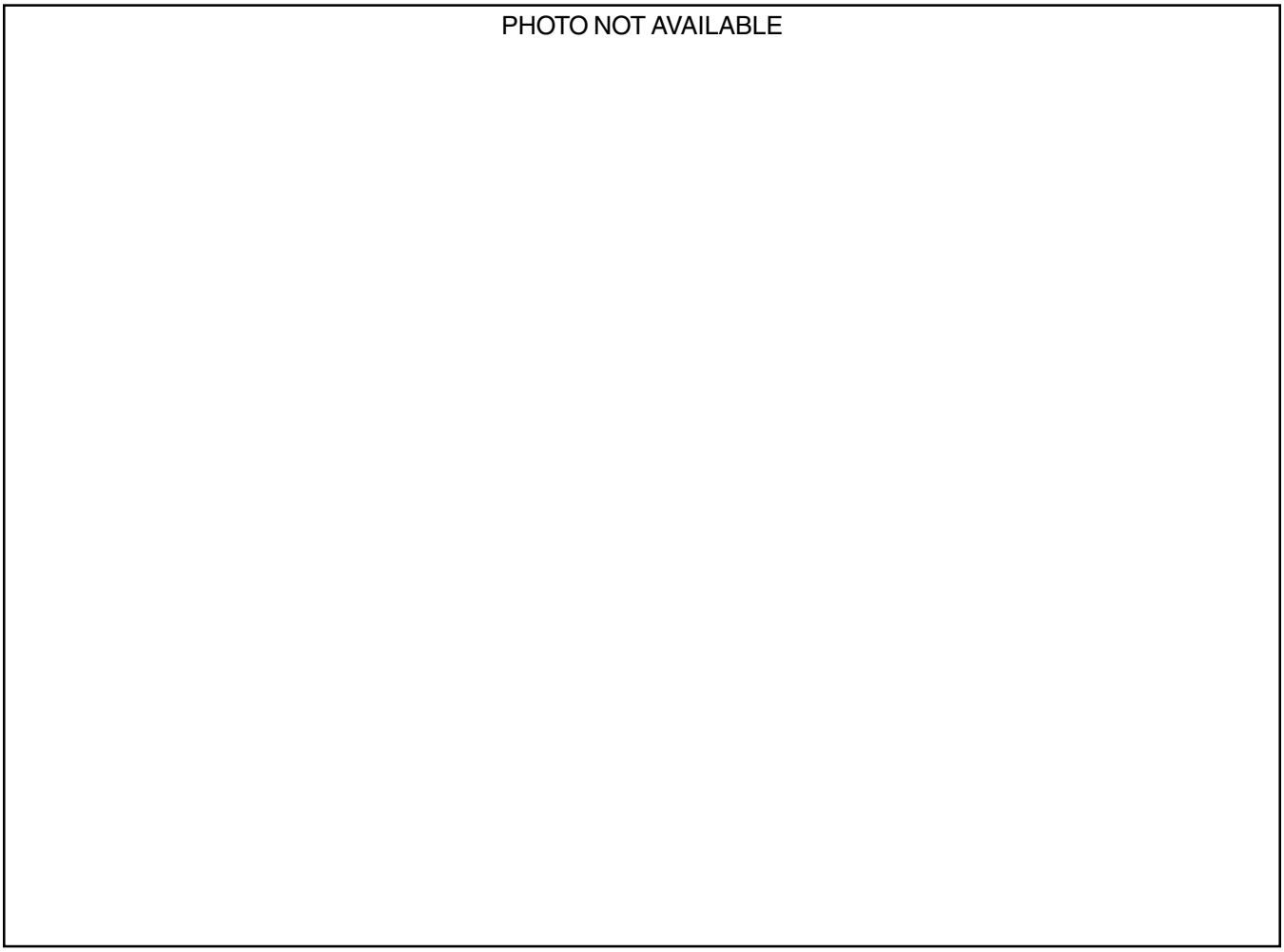

Figure 12.—A typical area of Orthents, loamy-skeletal, acid, steep. These soils formed in mine spoil. Some areas are used as trails for all-terrain vehicles.

- Testing of surface runoff and of the intermittent and perennial water impoundments can determine the presence of any chemicals that could pose a threat to humans or wildlife.
- Small and large stones hinder the use of equipment.

Dwellings

Suitability: Generally unsuited because of the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the slope

Interpretive Groups

Land capability classification: 7s

813F—Orthents, silty, bedrock substratum-Pits, mine, complex, steep

Composition

Orthents and similar soils: 55 to 60 percent
Pits and similar areas: 30 to 35 percent
Contrasting inclusions: 5 to 15 percent

Setting

Landform: Ground moraines
Landform position: Backslopes
Slope range: Orthents—18 to 35 percent
Major use: Areas of the Orthents have been reseeded to a vegetative cover of grasses.

Soil Properties and Qualities

Orthents

Drainage class: Well drained
Permeability: Moderately slow
Parent material: Mine spoil
Runoff: Rapid
Available water capacity: Very low
Depth to the seasonal high water table: More than 6 feet
Depth to bedrock: 10 to 20 inches
Organic matter content: Very low
Erosion hazard: Severe
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Orthents

Surface layer:
0 to 6 inches—mixed brown, greenish gray, and yellowish brown, firm silty clay loam

Substratum:
6 to 10 inches—mixed greenish gray and dark greenish gray, very firm silty clay loam
10 to 60 inches—greenish gray, weathered shale bedrock

Inclusions

Contrasting inclusions:
- Roads used for hauling equipment and coal
- Piles of gravel
- Areas covered by debris and abandoned machinery

Similar soils:
- Soils that have slopes of slightly less than 18 percent or more than 35 percent
- Soils that have more sand or more clay in the surface layer and in the upper part of the substratum
- Soils that are more than 20 inches deep to bedrock

Use and Management

Cropland

Suitability: Generally unsuited because of the slope

Pasture and hay

Suitability: Generally unsuited because of the slope

Wildlife habitat

Suitability: Moderately suited
Management considerations:
- Areas of the Orthents can provide habitat for openland wildlife.
- Grasses, such as bluegrass, tall fescue, timothy, purple top, or broom sedge, can be grown to provide cover for openland wildlife species, such as pheasants, songbirds, marsh hawks, red fox, and rabbits.
- Nesting cover should be protected from fire, traffic, grazing, mowing, or other disturbance until August 1.
- Testing of surface runoff and of the perennial water impoundments can determine the presence of any chemicals that could pose a threat to wildlife.

Dwellings

Suitability: Generally unsuited because of the depth to bedrock and the slope

Septic tank absorption fields

Suitability: Generally unsuited because of the depth to bedrock and the slope

Interpretive Groups

Land capability classification: Orthents—7s

823A—Schuline silty clay loam, 0 to 2 percent slopes

Composition

Schuline and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on ground moraines
Landform position: Summits
Major use: Cropland

Soil Properties and Qualities

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Parent material: Reclaimed mine spoil
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 9 inches—mixed dark grayish brown, gray, and yellowish brown, firm silty clay loam

Substratum:
9 to 16 inches—mixed brown, yellowish brown,

and gray, firm, calcareous clay loam and silty clay loam
16 to 40 inches—mixed brown, yellowish brown, and gray, firm, calcareous clay loam and loam
40 to 60 inches—mixed light brownish gray and yellowish brown, very firm, calcareous clay loam, silty clay loam, and silty clay

Inclusions

Contrasting inclusions:
• Poorly drained soils that are subject to ponding; in landscape positions below those of the Schuline soil
• Somewhat poorly drained soils in the slightly lower positions on the landscape

Similar soils:
• Soils that are not calcareous in the upper part of the substratum
• Soils that have slopes of slightly more than 2 percent
• Soils that are underlain by shale bedrock between the depths of 50 and 60 inches
• Soils that have less sand in the substratum
• Soils that have more clay in the substratum

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting reduces the hazard of erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Onsite investigation is needed because of the variability of the soil material.
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e

823B—Schuline silty clay loam, 2 to 5 percent slopes

Composition

Schuline and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Interfluves on ground moraines
Landform position: Backslopes
Major use: Cropland

Soil Properties and Qualities

Depth class: Deep
Drainage class: Well drained
Permeability: Slow
Parent material: Reclaimed mine spoil
Runoff: Medium
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Depth to bedrock: 50 to 60 inches
Organic matter content: Moderately low
Erosion hazard: Moderate
Shrink-swell potential: Moderate
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 7 inches—mixed dark grayish brown and yellowish brown, firm silty clay loam

Substratum:
7 to 15 inches—mixed brown and yellowish brown, firm, calcareous silty clay loam
15 to 37 inches—mixed brown and yellowish

brown, firm, calcareous loam, clay loam, and silty clay loam that are slightly brittle in parts
37 to 51 inches—mixed brown, yellowish brown, and dark grayish brown, firm, calcareous clay loam and loam
51 to 60 inches—greenish gray, weathered shale bedrock

Inclusions

Contrasting inclusions:
• Somewhat poorly drained soils in the slightly lower positions on the landscape
• Soils that are severely eroded and have a surface layer of clay loam or gravelly clay loam

Similar soils:
• Soils that are not calcareous in the upper part of the substratum
• Soils that have slopes of slightly more than 5 percent
• Soils that have less sand in the substratum
• Soils that have more clay in the substratum

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• A conservation tillage system that leaves crop residue on the surface after planting, terraces, contour farming, or a combination of these practices helps to control erosion.
• Tilling when the soil is wet causes surface cloddiness and compaction and excessive runoff and erosion.
• The moderate available water capacity is a limitation. Leaving crop residue on the surface after planting and returning crop residue to the soil or regularly adding other organic material conserve soil moisture. These practices also help to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Maintaining a cover of grasses and legumes reduces the hazard of erosion.
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Tilling on the contour for seeding or pasture renovation helps to establish forage species and helps to control erosion.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition and reduce the hazard of erosion.

Dwellings

Suitability: Moderately suited
Management considerations:
• Onsite investigation is needed because of the variability of the soil material.
• Reinforcing the foundations or extending the footings below the subsoil helps to minimize the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Onsite investigation is required. The design of absorption fields should meet local and State guidelines.

Interpretive Groups

Land capability classification: 2e

3424A—Shoals silt loam, 0 to 2 percent slopes, frequently flooded

Composition

Shoals and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Flood plains
Flooding frequency: Frequently flooded
Flooding duration: Brief
Major use: Cropland

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 0.5 foot to 1.5 feet
Organic matter content: Moderate
Erosion hazard: Slight
Shrink-swell potential: Moderate
Potential for frost action: High

Typical Profile

Surface layer:
0 to 8 inches—brown, friable silt loam

Subsoil:
8 to 17 inches—brown, mottled, friable silt loam
17 to 37 inches—grayish brown, mottled, friable silt loam

Substratum:
37 to 60 inches—gray, mottled, friable loam

Inclusions

Contrasting inclusions:
• The well drained Hickory soils, which formed in till; on backslopes above the Shoals soil
• The well drained Stonelick soils in the slightly higher positions on the flood plains

Similar soils:
• Soils that have a seasonal high water table between the depths of 1.5 and 4.0 feet and do not have mottles in the subsoil
• Soils that are stratified with sandy textures

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• The seasonal high water table delays planting in some years. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Crops may be damaged by floodwater in some years. Dikes and floodwater diversions can minimize the extent of crop damage.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Alsike clover, reed canarygrass, ladino clover, tall fescue, red clover, and smooth bromegrass are suited to this soil. Suitable warm-season grasses include switchgrass and big bluestem.
• Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Pasture plants may be damaged by floodwater in some years. Dikes and floodwater diversions can minimize the extent of damage.
• Proper stocking rates and rotation grazing or deferred grazing during wet periods help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited
Management considerations:
• The use of equipment is limited to periods when the soil is firm.
• Planting mature stock and planting on ridges reduce the seedling mortality rate. Some replanting may be necessary.
• Using a harvesting method that does not leave the remaining trees isolated or widely spaced and removing only high-value trees from a strip 50 feet wide along the western and southern edges of the woodland can reduce the windthrow hazard.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 5W

3450A—Brouillett silt loam, 0 to 2 percent slopes, frequently flooded

Composition

Brouillett and similar soils: 90 to 95 percent
Contrasting inclusions: 5 to 10 percent

Setting

Landform: Flood plains
Flooding frequency: Frequently flooded
Flooding duration: Brief
Major uses: Cropland; pasture and hay

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: 1 to 2 feet
Organic matter content: High
Erosion hazard: Slight
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 11 inches—very dark gray, friable silt loam

Subsurface layer:
11 to 26 inches—very dark gray, friable silt loam

Subsoil:
26 to 34 inches—dark grayish brown, friable silt loam
34 to 42 inches—light brownish gray, mottled, friable silt loam

Substratum:
42 to 60 inches—light brownish gray, mottled, friable, stratified silt loam and loam

Inclusions

Contrasting inclusions:
• The well drained Genesee and Stonelick soils in positions on the flood plains similar to or slightly higher than those of the Brouillett soil
• The well drained Hickory and Senachwine soils, which formed in till; on backslopes above the Brouillett soil

Similar soils:
• Soils that have less than 24 inches of very dark gray colors at the surface
• Soils that have more sand throughout
• Soils that are silty clay loam in the surface layer and subsurface layer
• Soils that have a seasonal high water table within a depth of 1 foot and are mottled in the subsurface layer and in the upper part of the subsoil

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• The seasonal high water table delays planting in some years. Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Crops may be damaged by floodwater in some years. Dikes and floodwater diversions can minimize the extent of crop damage.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Smooth bromegrass, orchardgrass, tall fescue, red clover, and alfalfa are suited to this soil. Suitable warm-season grasses include big bluestem, indiangrass, and switchgrass.
• Surface and subsurface drainage systems help to lower the seasonal high water table if suitable outlets are available.
• Pasture plants may be damaged by floodwater in some years. Dikes and floodwater diversions can minimize the extent of damage.
• Proper stocking rates and rotation grazing or deferred grazing when the soil is wet can help to keep the pasture in good condition.

Woodland

Suitability: Moderately suited
Management considerations:
• The use of equipment is limited to periods when the soil is firm.
• Planting mature stock and planting on ridges reduce the seedling mortality rate. Some replanting may be necessary.
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 3w
Woodland ordination symbol: 2W

8431A—Genesee sandy loam, 0 to 2 percent slopes, occasionally flooded

Composition

Genesee and similar soils: 94 to 98 percent
Contrasting inclusions: 2 to 6 percent

Setting

Landform: Flood plains
Flooding frequency: Occasionally flooded

Flooding duration: Brief
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Parent material: Alluvium
Runoff: Slow
Available water capacity: High
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Hazard of soil blowing: Severe
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 7 inches—brown, very friable sandy loam

Subsoil:
7 to 24 inches—brown, friable loam
24 to 46 inches —brown, friable, calcareous loam
46 to 60 inches—brown, friable, calcareous silt loam

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Shoals soils in nearly level positions below the Genesee soil

Similar soils:
• Soils that have a darker surface layer
• Soils that have a seasonal high water table between the depths of 4 and 6 feet and are mottled

Use and Management

Cropland

Suitability: Well suited
Management considerations:
• Crops may be damaged by floodwater in some years. Dikes and floodwater diversions can minimize the extent of crop damage.
• The hazard of soil blowing is severe. Using a system of conservation tillage, such as no-till or mulch till, that leaves crop residue on the surface after planting, planting at right angles to the prevailing winds, avoiding fall tillage, planting cover crops, and establishing field windbreaks help to control soil blowing.
• Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Smooth bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Pasture plants may be damaged by floodwater in some years. Dikes and floodwater diversions can minimize the extent of damage.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management considerations:
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 8A

8665A—Stonelick fine sandy loam, 0 to 2 percent slopes, occasionally flooded

Composition

Stonelick and similar soils: 94 to 98 percent
Contrasting inclusions: 2 to 6 percent

Setting

Landform: Flood plains
Flooding frequency: Occasionally flooded
Flooding duration: Very brief
Major use: Cropland

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Alluvium

Runoff: Slow
Available water capacity: Moderate
Depth to the seasonal high water table: More than 6 feet
Organic matter content: Moderately low
Hazard of soil blowing: Severe
Shrink-swell potential: Low
Potential for frost action: Moderate

Typical Profile

Surface layer:
0 to 9 inches—dark brown, friable, calcareous fine sandy loam

Substratum:
9 to 23 inches—brown, friable, calcareous fine sandy loam
23 to 31 inches—brown, loose, calcareous loamy fine sand
31 to 44 inches—brown, friable and very friable, calcareous fine sandy loam
44 to 60 inches—brown, very friable and loose, stratified fine sandy loam and loamy fine sand

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Shoals soils in the lower positions on the landscape

Similar soils:
• Soils that have a thicker surface layer
• Soils that have more clay in the substratum
• Soils that are not calcareous
• Soils that have a seasonal high water table between the depths of 4 and 6 feet and are mottled

Use and Management

Cropland

Suitability: Moderately suited
Management considerations:
• Crops may be damaged by floodwater in some years. Dikes and floodwater diversions can minimize the extent of crop damage.
• The hazard of soil blowing is severe. Using a system of conservation tillage, such as no-till or mulch till, that leaves crop residue on the surface after planting, planting at right angles to the prevailing winds, avoiding fall tillage, planting cover crops, and establishing field windbreaks help to control soil blowing.
• The moderate available water capacity is a limitation. Leaving crop residue on the surface after planting and returning crop residue to the soil or regularly adding other organic material conserve soil moisture. These practices also help to maintain tilth and fertility.

Pasture and hay

Suitability: Well suited
Management considerations:
• Smooth bromegrass, orchardgrass, tall fescue, and alfalfa are suited to this soil. Suitable warm-season grasses include indiangrass, switchgrass, and big bluestem.
• Pasture plants may be damaged by floodwater in some years. Dikes and floodwater diversions can minimize the extent of damage.
• Proper stocking rates and rotation grazing help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Management considerations:
• Measures that protect the woodland from fire minimize injury to trees and help to maintain the leaf mulch.
• Excluding livestock from the woodland helps to minimize compaction of the soil, damage to tree roots, and destruction of desirable young trees and of the leaf mulch.

Dwellings

Suitability: Generally unsuited because of the flooding

Septic tank absorption fields

Suitability: Generally unsuited because of the flooding

Interpretive Groups

Land capability classification: 2w
Woodland ordination symbol: 4A

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land,

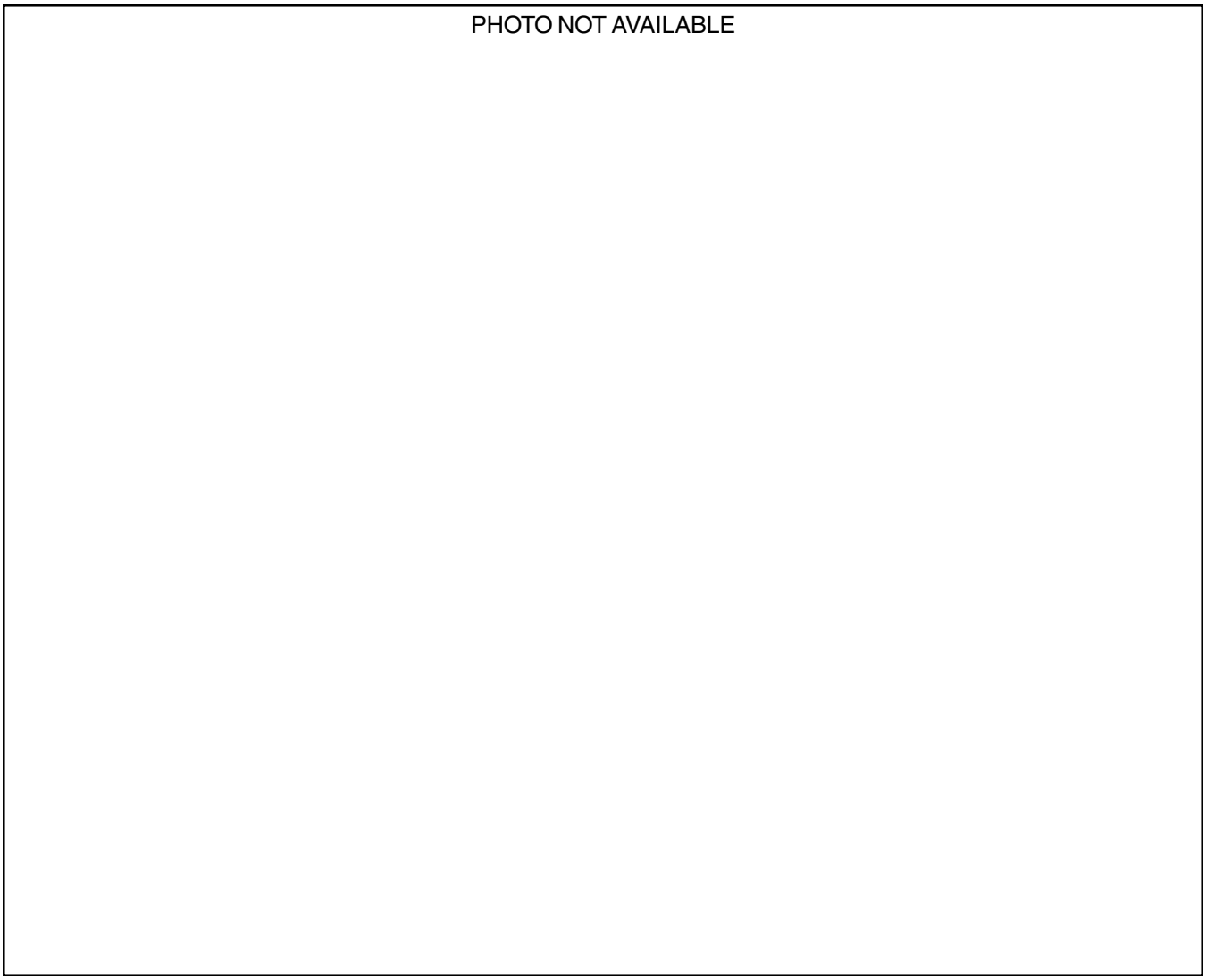

Figure 13.—Drummer silty clay loam, 0 to 2 percent slopes (in the background), and Flanagan silt loam, 0 to 2 percent slopes, produce high yields of corn and soybeans. The Flanagan soil and drained areas of the Drummer soil are considered prime farmland.

pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied (fig. 13). In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 354,000 acres in Edgar County, or nearly 89 percent of the total acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the county, but most are in associations 1, 2, 3, 4, 5, and 7, which are described under the heading “General Soil Map Units.” Most of this prime farmland is used for crops, mainly corn and soybeans.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime

farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in Edgar County. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Raymond E. Coombes, district conservationist, Natural Resources Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed for each soil, and the system of land capability classification used by the Natural Resources Conservation Service is explained.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading “Detailed Soil Map Units.” Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 1992, an estimated 327,179 acres in Edgar County was used as cropland and 18,199 acres was used as pasture (U.S. Department of Commerce, 1994).

The soils in Edgar County have good potential for continued crop production, particularly if the latest crop production technologies are applied. This soil survey can greatly facilitate the application of such technology. It also provides the resource data needed for land use planning. Land use planners and decision makers can use the information in this survey as a guide for making decisions that will ensure orderly growth and development of urban and rural areas.

In areas used as cropland, management measures that control water erosion and soil blowing, remove excess water, control flooding, conserve soil moisture, and maintain tilth and fertility are needed.

Water erosion is a potential problem on about 30 percent of the cropland and pastureland in the county. Sheet and rill erosion is a hazard on soils that have slopes of more than 2 percent, such as Dana, Russell, Senachwine, and Wyanet soils. Sheet and rill erosion may also occur on soils that have slopes of less than 2 percent if the slope length is very long.

Loss of the surface layer by sheet and rill erosion reduces the productive capacity of the soil. As the surface layer is removed, material from the subsoil is incorporated into the tilled layer. The subsoil generally has lower levels of plant nutrients, a lower content of organic matter, and a higher content of clay than the surface layer. As the content of organic matter in the tilled layer decreases and the clay content increases, soil tilth is negatively affected. Deterioration of soil tilth increases the likelihood that a crust will form on the

surface and that the rate of water infiltration will be reduced. The higher clay content also increases the likelihood that the surface layer will become cloddy when tilled, especially if tilled when wet. The cloddiness makes preparing a seedbed very difficult. The soils that are susceptible to sheet and rill erosion also tend to puddle after hard rains, and a crust can form on the surface when the soils dry. The surface crust increases the runoff rate.

Water erosion can result in sediment entering streams, rivers, water impoundments, and road ditches. Removing the sediment is expensive. Management measures that control erosion also help to prevent this sedimentation and improve the quality of water available for rural, municipal, and recreational uses and for fish and wildlife.

Measures that reduce the hazard of sheet and rill erosion include several cultural and structural practices. A conservation tillage system, such as no-till or mulch till, that leaves crop residue on the surface after planting and a crop rotation that includes 1 or more years of grasses and legumes help to keep soil losses within tolerable limits and maintain the productive capacity of the soil. Farming on the contour and reducing the length of slopes with terraces or diversions also help to control erosion by reducing the amount and velocity of runoff and increasing the rate of water infiltration. These practices are most effective in areas where slopes are smooth and uniform. No-till systems are generally well suited to all of the soils in the county, except for poorly drained and very poorly drained soils. Because of wetness in areas of these soils, planting is generally delayed and seed germination can be hindered.

Grassed waterways help to convey runoff downslope without causing erosion or flooding. They generally are used in conjunction with other conservation practices, such as terraces, diversions, conservation tillage systems, and contour farming. These conservation practices help to manage runoff effectively, reduce the hazard of erosion, and improve water quality. Grassed waterways are most effective on slopes of 2 percent or more.

Soil blowing is a hazard on about 2 percent of the soils in the county. These soils have a surface layer of very fine sandy loam or sandy loam, or they have a large amount of finely divided calcium carbonate or clay in the surface layer. Genesee and Stonelick soils are subject to soil blowing because they have a sandy surface layer, Harpster soils have a high amount of calcium carbonate in the surface layer, and Milford and Peotone soils have a high content of clay in the surface layer. The hazard of soil blowing can be reduced by using a system of conservation tillage, such as no-till or mulch till, that leaves crop residue on the surface after planting, planting at right angles to the prevailing winds, avoiding fall tillage, planting cover crops, and establishing field windbreaks.

Further information about erosion-control measures suitable for each kind of soil is provided in the "Technical Guide," which is available in local offices of the Natural Resources Conservation Service.

Drainage systems have been installed in approximately 70 percent of the soils used for crops and pasture. Many of the soils are naturally so wet that crop production of common crops would not be possible without surface or subsurface drainage systems. Examples of poorly drained soils are Drummer, Milford, Pella, and Virden soils. Even somewhat poorly drained soils, such as Fincastle, Kendall, Raub, Starks, and Toronto soils, are wet enough in some years that crop growth and productivity are hampered.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface ditches and subsurface tile drainage is often used in areas of poorly drained and very poorly drained soils. In soils that have slow or very slow permeability, spacing the tiles about 50 to 70 feet apart helps to ensure adequate drainage.

Further information about drainage systems suitable for each kind of soil is provided in the "Technical Guide," which is available in local offices of the Natural Resources Conservation Service.

Flooding is a hazard on approximately 14,000 acres in Edgar County. Damage to crops occurs in some years. Dikes and floodwater diversions help to minimize the extent of crop damage. Controlling runoff from higher areas in the watershed reduces the frequency and severity of flooding. Brouillett and Stonelick soils are examples of soils that are subject to flooding.

Soil droughtiness limits the productivity of some of the soils in Edgar County. The physical composition of these soils limits the amount of water available for plant growth. The effects of droughtiness can be minimized by reducing the runoff rate, increasing the rate of water infiltration, and increasing the water-holding capacity of the soils. Leaving crop residue on the surface after planting and returning crop residue to the soil or regularly adding other organic material conserve soil moisture. Atlas, Hosmer, and Senachwine soils are examples of soils that have a moderate or low available water capacity.

Soil tilth is an important factor affecting the emergence of seedlings, the amount of runoff, and the infiltration of water into the soil. Soils that have good tilth are granular and porous and have a high content

of organic matter in the surface layer. Soils that have poor tilth generally have more clay, a lower content of organic matter, and weaker soil structure in the surface layer. In soils with poor tilth, a crust often forms at the surface during periods of intense rainfall. This crust is hard when dry. It inhibits seedling emergence, increases the runoff rate and the hazard of erosion, and reduces the rate of water infiltration. Leaving crop residue on the surface and regularly adding animal manure, green manure crops, or other organic material to the soil increase the content of organic matter, improve soil structure, and minimize crusting.

Poor tilth is commonly a problem in poorly drained and very poorly drained soils, such as Drummer, Milford, and Peotone soils, which have a surface layer of silty clay loam. If these soils are plowed while wet, they become cloddy. The cloddiness makes the preparation of a good seedbed difficult. Tilling in the fall and leaving the surface rough generally result in good tilth in the spring. A system of ridge-tilling may also be effective on these soils. If the soils are plowed in the fall, leaving a sufficient cover of crop residue on the surface can minimize the hazard of soil blowing.

Natural fertility is high in Brenton, Drummer, and Elburn soils and in other soils that have a dark surface layer with a high content of organic matter. These soils formed under tall grass prairies. They are extensive in the Drummer-Elburn, Drummer-Milford, Drummer-Flanagan, and Dana-Drummer-Raub associations, which are described under the heading "General Soil Map Units." Natural fertility is lower in soils that formed under deciduous hardwoods, such as Hickory, Russell, Stoy, and Xenia soils. These soils have a light colored surface layer that is moderately low or low in organic matter content. They are common in the Xenia-Senachwine-Drummer, Senachwine-Russell, Camden-Starks, and Weir-Stoy-Hickory associations. Generally, these soils are also more acid than the soils that have high natural fertility. Applying limestone helps to raise the pH to a level that is optimum for plant growth. Calcareous soils, such as Harpster soils, have a naturally high pH and do not require applications of lime, but iron, potassium, and phosphorus are not readily available in these soils. Also, potassium is not readily available in sandy soils, such as Stonelick soils.

Three cultural practices can be used to maintain or improve soil fertility. First, planting legumes in rotation or as a cover crop adds nitrogen and organic matter to the soil. Second, returning crop residue, animal manure, green manure crops, and other organic material to the soil increases the content of organic matter. Organic matter increases the nutrient-holding capacity of the soil and supplies nutrients to growing plants. Third, commercial fertilizers can be used. On most soils in the county, crops respond well to applications of nitrogen, phosphorus, potassium, and certain micronutrients. Applications of lime, fertilizers, and manure should be based on the results of soil tests. The local office of the Cooperative Extension Service can help in determining the kinds and amounts of nutrients needed.

Suitable pasture and hay plants include several legumes, cool-season grasses, and native warm-season grasses. Alfalfa, red clover, alsike clover, and ladino clover are legumes commonly grown in the county. Alfalfa is best suited to well drained and moderately well drained soils and to some of the somewhat poorly drained soils, such as Brouillett (fig. 14), Flanagan, Russell, Senachwine, and Xenia soils. Other legumes, such as alsike clover, red clover, and ladino clover, are more tolerant of wetter conditions and are grown in areas of very poorly drained and poorly drained soils and some of the somewhat poorly drained soils, such as Drummer, Fincastle, Starks, and Weir soils.

Cool-season grasses commonly grown in the county include smooth bromegrass, orchardgrass, reed canarygrass, and tall fescue. These grasses can be used alone or in mixtures with legumes. Native warm-season grasses, such as indiangrass, big bluestem, and switchgrass, grow very well in the summer. The management techniques needed for these grasses are different from those needed for cool-season grasses.

Measures that improve fertility, prevent overgrazing, and control erosion are needed in the areas used for pasture and hay. Applications of lime and fertilizer should be based on the results of soil tests, the needs of the plants, and the expected level of yields. Overgrazing reduces plant vigor, reduces forage yields, and increases the hazard of erosion.

Using proper stocking rates, applying a system of rotation grazing, deferring grazing during wet periods, and applying lime and fertilizers help to keep the pasture in good condition and reduce the hazard of erosion.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

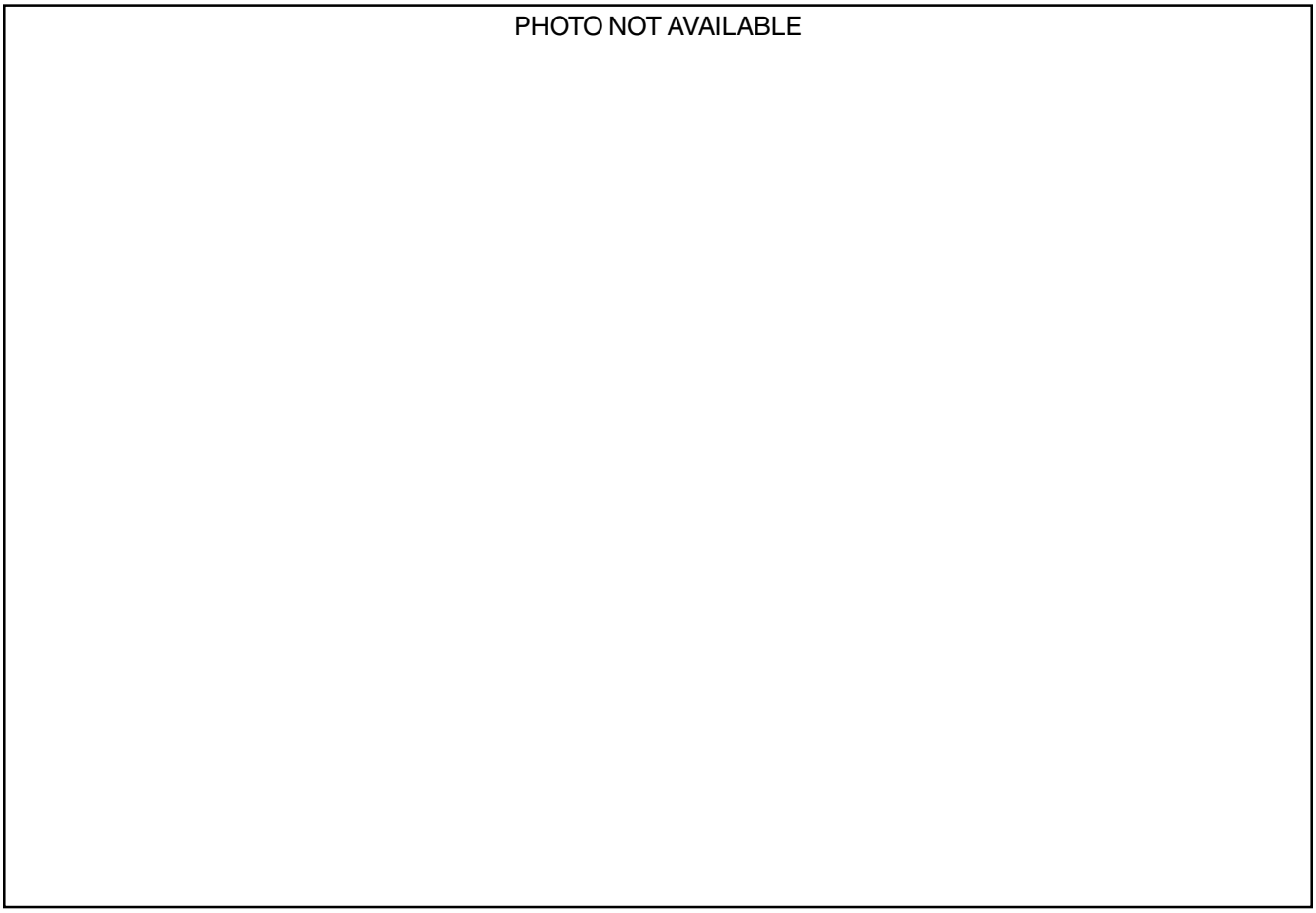

Figure 14.—Pasture in an area of Brouillett silt loam, 0 to 2 percent slopes, frequently flooded.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents (Fehrenbacher and others, 1978). Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the

soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA, 1961). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation.

Class 7 soils have very severe limitations that make them unsuitable for cultivation.

Class 8 soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, ***e, w, s,*** or ***c,*** to the class numeral, for example, 2e. The letter ***e*** shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; ***w*** shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); ***s*** shows that the soil is limited mainly because it is shallow, droughty, or stony; and ***c,*** used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by ***w, s,*** or ***c*** because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of the map units in the survey area is given in the section “Detailed Soil Map Units” and in the yields table.

Woodland Management and Productivity

Bruce K. Bennett, former state staff forester, Natural Resources Conservation Service, helped prepare this section.

When the first European settlers arrived in the survey area, virgin forests covered about 32 percent of the acreage. Since then, most of the trees have been cleared from the areas that are most suitable for cultivation. The remaining woodland is mainly in areas that have some type of severe limitation affecting cultivation. If properly managed, the soils in the remaining areas of woodland are generally well suited to the production of high-quality trees.

In 1992, about 15,939 acres, or approximately 4 percent of the acreage in Edgar County, was woodland (U.S. Department of Commerce, 1994). Most of the woodland acreage is privately owned. The major woodland species are oaks, hickories, elms, ashes, and maples, especially soft maple. The largest areas of woodland are in the Senachwine-Russell, Camden-Starks, and Weir-Stoy-Hickory associations, which are described under the heading “General Soil Map Units.”

The productivity of many of the woodland stands could be improved with proper management. Management practices commonly needed in these areas are excluding livestock from the woodland; providing protection from fire, insects, and diseases; using proper logging methods; and using proven silvicultural methods that enhance growth and regeneration.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the ***ordination symbol***, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce in a pure stand under natural conditions. The number 1 indicates low potential productivity; 2 or 3, moderate; 4 or 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter ***R*** indicates steep slopes; ***X***,

stoniness or rockiness; ***W***, excess water in or on the soil; ***T***, toxic substances in the soil; ***D***, restricted rooting depth; ***C***, clay in the upper part of the soil; ***S***, sandy texture; ***F***, a high content of rock fragments in the soil; ***L***, low strength; and ***N***, snowpack. The letter ***A*** indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, F, L, and N.

In table 7, ***slight, moderate,*** and ***severe*** indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of ***slight*** indicates that no particular prevention measures are needed under ordinary conditions. A rating of ***moderate*** indicates that erosion-control measures are needed in certain silvicultural activities. A rating of ***severe*** indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of ***slight*** indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of ***moderate*** indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of ***severe*** indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of ***slight*** indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of ***moderate*** indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of ***severe*** indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of ***slight*** indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of ***moderate*** indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of ***severe*** indicates that many trees can be blown down during these periods.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of ***slight*** indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of ***moderate*** indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of ***severe*** indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The ***potential productivity*** of merchantable or ***common trees*** on a soil is expressed as a ***site index*** and as a ***volume*** number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The ***volume***, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under ***common trees*** for a

soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service or of the Cooperative Extension Service or from a commercial nursery.

Recreation

Only a small acreage in Edgar County is developed for recreational uses. The most popular of these is the area around Twin Lakes. A few small recreational areas, both publicly and privately owned, are scattered throughout the county. These include playgrounds, athletic fields, golf courses, fishing ponds, camping and picnic areas, and target shooting and hunting areas.

The potential for further recreational development is favorable throughout the county. The soils having the best potential are in the Senachwine-Russell association, which is described under the heading "General Soil Map Units." These soils are in areas where a hilly terrain, wooded slopes, and numerous streams provide a variety of opportunities for recreation.

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. ***Slight*** means that soil properties are generally favorable and that limitations are minor and easily overcome. ***Moderate*** means that limitations can be overcome or alleviated by planning, design, or special maintenance. ***Severe*** means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm

when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Paul Brewer, district wildlife biologist, Illinois Department of Conservation, helped prepare this section.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Good wildlife habitat provides the necessary cover types to supply food, water, an area to raise young, a place to escape predators, and protection from severe weather. Wildlife habitat can be maintained, created, or improved. Maintenance of habitat can be accomplished by protecting existing habitat, including grasslands, woodlands, and wetlands. Habitat can be created by planting grasses, legumes, trees, shrubs, and field crops that are beneficial for wildlife or by creating wetland areas, such as shallow ponds. Habitat can be improved by adding the “missing link” in existing habitat, for example, a food plot or stand of native grasses to provide winter habitat in an area that provides good habitat during the rest of the year.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat, and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of ***good*** indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of ***fair*** indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of ***poor*** indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of ***very poor*** indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

Consulting a qualified wildlife biologist can be helpful when the establishment or restoration of wildlife habitat is to be undertaken. The Edgar County Soil and Water Conservation District can provide assistance.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, and oats.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are smooth bromegrass, timothy, redtop, introduced clovers (such as alsike clover and ladino clover), bluegrass, introduced lespedezas, and alfalfa. Tall fescue, which is commonly planted for erosion control and for pasture, is not recommended as part of the management for wildlife habitat. The stands of this plant can be overly dense and are likely to become matted. Also, they can be infected with endophytes

and thus can cause illness in domestic animals and wildlife. Some introduced grasses, such as Johnsongrass, have become noxious weeds.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Because native plants have been in Edgar County for the greatest length of time, these plants, as a group, are well adapted to a wide range of soil types. Examples of wild herbaceous plants are big bluestem, little bluestem, switchgrass, indiangrass, sideoats grama, goldenrods, prairie dock, compass plant, buffalo clover, bluebells, violets, trilliums, and wild coneflowers. Some weedy plants, which have mainly been introduced, compete with nonweedy native plants. Native grasses and forbs provide excellent habitat for a variety of wildlife. Wildlife species that depend on grassland habitat have declined sharply in recent years in Edgar County as prairies have vanished and as the artificial prairies associated with good livestock management have also declined.

Hardwood trees and woody understory produce food or mast in the form of nuts or other fruit and browse in the form of buds, catkins, twigs, bark, and foliage. Trees and shrubs also provide protective cover for nesting or for rearing of young. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oaks, hickories, sycamore, cottonwood, elms, sassafras, serviceberry, gray dogwood, flowering dogwood, hazelnut, sumacs, and raspberries. Exotic trees and shrubs, such as autumn-olive, Amur maple, Russian-olive, introduced crabapples, and bush honeysuckle, should be avoided. These plants were once promoted as beneficial for wildlife, but they have escaped cultivation and are now reaching nuisance proportions in many areas. The best native plants for soils rated ***good*** include hazelnut, gray dogwood, silky dogwood, oaks, and hickories.

Coniferous plants furnish browse, good nesting and winter cover, and seeds. Redcedar provides the most easily accessible seeds; the seeds in most other coniferous plants are inside the cones, which may be difficult for the animals to open. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are white pine, Norway spruce, balsam fir, redcedar, and juniper.

Wetland plants are annual and perennial native and introduced herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants, such as arrowhead or water lilies, are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are cattails, cordgrass, marsh spikerush, river bulrush, wild blue iris, purple ammania, tickseed sunflower, jewelweed, buttercups, frog-fruit, butterweed, smartweeds, nutsedge, beggarticks, and false stinging nettles.

Shallow water areas are listed along with the various vegetation types because of the unique kind of habitat they provide. They have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures that hold water seasonally or year round. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Shallow water areas can be included in the design of ponds and lakes by utilizing the naturally shallow end of the impoundment. Wetland areas can also be created by installing water-control valves on field drainage tiles and by allowing the flooding of fields at times not necessary for the production of crops, such as after fall harvest. Valves can be opened so that fields can be drained for spring planting. Islands, wood duck boxes, and an even mix of open water and aquatic plants help to provide optimum wildlife habitat in permanent wetland areas.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife can also be described as grassland habitat or “edge” habitat (the edge between openland and woodland). Prairie areas, railroad right-of-ways, cropland edges, pasture, meadows, abandoned pastures, field border strips, and properly managed roadsides all provide this type of habitat. Wildlife attracted to these areas include bobwhite quail, pheasants, cottontail rabbits, bobolinks, cardinals, upland sandpipers, horned larks, kingbirds, mockingbirds, bluebirds (with nest boxes), raccoons, fox squirrels, and red fox. Wild turkeys, which have been reintroduced in Edgar County, commonly prefer woodland edges for nesting.

Habitat for woodland wildlife consists of areas of existing deciduous forests or plantings of native deciduous trees. Good woodland management can provide a financial return through periodic harvest of carefully selected trees, but it can also provide good habitat for wildlife. Wildlife attracted to the woodland in the county include white-tailed deer, wood thrush,

chickadee, scarlet tanager, pileated woodpecker, gray squirrel, woodcock, raccoon, many species of colorful warblers, and wild turkey. Wood ducks, hooded mergansers, and belted kingfishers also nest along wooded streams and rivers.

Habitat for wetland wildlife consists of open water, marshes, or swampy bottom-land sloughs or oxbows. Seasonally flooded farmed wetlands are also important spring and fall feeding areas for migrating ducks, geese, and shore birds, such as sandpipers and the golden plover. Wildlife dependent on wetland habitat include many species of ducks, geese, egrets, herons, plovers, sandpipers, phalaropes, curlews, rails, marsh wrens, some swallows, mink, muskrat, and beaver.

The soils in Edgar County provide valuable habitat for a variety of wildlife species, including quail, deer, rabbits, squirrels, and many important nongame species. The kind and abundance of wildlife in the county reflect the soil types, land use, and vegetation. Before settlement, many of the soils in the county were saturated with a seasonal high water table above or near the surface for much of the year. Although some areas were wooded, especially those along creeks and on moderately steep to very steep landforms, the native plant communities were dominated by tall prairie grasses. Because of the seasonal high water table, these prairies included many wet meadow and marsh plants (Parmalee, 1968).

Wildlife that were formerly abundant in the prairie areas included ducks, geese, shore birds, muskrat, mink, raccoons, prairie chickens, upland sandpipers, bison, and other grassland birds and mammals. Less conspicuous, but a very important part of the natural fauna, were the reptiles and amphibians of the wet prairie. The wooded areas and the transition areas between the prairies and the woodlands originally provided habitat for cottontail rabbits, bobwhite quail, cardinals, wood thrush, deer, elk, bear, moose, and many other species (Parmalee, 1968).

After the county was settled, drainage systems, intensive cultivation, woodland clearing, and increased human populations altered the wildlife communities. The wildlife species that survived and remained in the area were those that were more adaptable and tolerant of human settlements and activities, such as horned lark, mourning doves, cardinals, raccoon, and white-tailed deer. Streams and lakes are inhabited by smallmouth bass, largemouth bass, catfish, sunfish, carp, and other fish. Many farm ponds are stocked with largemouth bass, bluegill, and channel catfish.

Areas used as wildlife habitat are not necessarily set aside for this purpose. Wildlife habitat is commonly a secondary use in areas used for other purposes, such as farming. For example, the large areas of nearly level to gently sloping soils used for cultivated crops and pasture are also well suited to use as habitat for openland wildlife.

In the following paragraphs the associations in Edgar County, which are described under the heading "General Soil Map Units," are grouped into three wildlife areas. The plants and animals common in each area are specified.

Wildlife area 1 consists of the Drummer-Elburn, Drummer-Milford, Drummer-Flanagan, and Dana-Drummer-Raub associations. The soils are on nearly level to gently sloping outwash plains, glacial lakes (relict), ground moraines, and end moraines. Except for the moderately well drained Dana soils and some of the minor soils, all of the soils have a seasonal high water table above or near the surface in the spring and are poorly drained or somewhat poorly drained.

This wildlife area is used mainly as cropland. Corn and soybeans are the major crops. A few small areas are used for pasture and hay. Wildlife habitat is generally of poor quality because of a scarcity of crop residue, herbaceous nesting and roosting cover, woody cover, and travel lanes or hedgerows. Originally, this area was part of a broad, tall-grass prairie that contained wet meadows, marshes, and areas of open water. This area is near the southern limit of the midwestern "prairie pothole" region that provided valuable nesting and stopover habitat for migratory waterfowl and habitat for other wetland and openland wildlife. A large prairie pothole that was drained in the early part of the 20th century was the historic Goose Lake, north and west of Garland. This wide, shallow depression was intermittently covered with water and provided valuable habitat for wetland wildlife.

The poorly drained soils in this wildlife area are well suited to habitat for wetland wildlife, such as ducks, geese, mink, muskrat, frogs, turtles, salamanders, herons, woodcock, shore birds, and songbirds. A large percentage of the area is subject to ponding and subsequent crop damage, although nearly all of the area has been artificially drained. The manmade drainage ditches provide some benefit for wetland wildlife by maintaining a perennial watercourse. Measures that could improve the habitat for wetland wildlife include delaying or limiting the cultivation and planting of commodity crops in the shallow depressions that are subject to ponding; protecting areas of smartweeds, bulrushes, bur-reeds, and barnyard grasses; and planting Japanese millet, milo, and short corn varieties for food and cover. Shallow ponds and marshes can be created by blocking

natural channels and manmade drainage systems. Digging pits in poorly drained or very poorly drained soils can encourage nesting by ducks. The pits should be at least 30 feet in diameter and 2 to 3 feet deep. They can provide areas of open water throughout the spring and early summer. These areas should be protected from grazing.

This wildlife area is also well suited to habitat for openland wildlife. The areas along field borders, roads, and drainageways, the meadows, and the pastured areas provide habitat for cottontail rabbit, red fox, ring-necked pheasant, woodcock, owls, meadowlark, mourning dove, and many types of songbirds. Measures that improve the habitat for openland wildlife include seeding roadsides, fence rows, wildlife travel lanes, and land that has been set aside as part of government commodity programs to perennial plants and legumes, such as smooth bromegrass, timothy, redtop, bluegrass, alfalfa, red clover, ladino clover, or alsike clover; enhancing grassy areas with perennial native prairie grasses, such as big bluestem, little bluestem, switchgrass, and indiangrass; and protecting nesting cover from fire, traffic, grazing, mowing, or other disturbance until August 1. Warm-season grasses thrive under a system of periodic prescribed burning. Any existing woody cover should be protected from fire and grazing. Establishing hedgerows and windbreaks of certain trees and shrubs can provide a source of food and roosting areas. Brush piles can be built to provide cover along fence rows and in odd-shaped areas that are inconvenient for cultivation. Leaving crop residue on the surface after harvest and leaving waste grain in the fields provide food and cover throughout the winter. Also, some areas that are near wildlife cover can be left unharvested.

Wildlife area 2 consists of the Xenia-Senachwine-Drummer and Camden-Starks associations. The soils are on nearly level to moderately sloping ground moraines, end moraines, outwash plains, and stream terraces. They are poorly drained to well drained. The native vegetation in this area consisted of woodland and areas of mixed prairie and woodland. Extensive clearing for purposes of cultivation removed most of the trees from the less sloping areas. Some of the more sloping areas and the flood plains along creeks are still wooded. This wildlife area is well suited to habitat for openland wildlife. The major wildlife species are mourning dove, cottontail rabbit, bobwhite quail, fox, meadowlark, ground squirrel, owls, and a variety of reptiles and amphibians.

This wildlife area is much more diverse than wildlife area 1. It consists mostly of cropland but also contains areas used for pasture and hay and small areas of woodland. The diversity of land use and the creeks and ponds in the area provide favorable habitat for a wide variety of wildlife.

Measures that improve the habitat for openland wildlife include seeding roadsides, fence rows, wildlife travel lanes, and land that has been set aside as part of government commodity programs to perennial plants and legumes, such as smooth bromegrass, timothy, redtop, bluegrass, alfalfa, red clover, ladino clover, or alsike clover; enhancing grassy areas with perennial native prairie grasses, such as big bluestem, little bluestem, switchgrass, and indiangrass; and protecting nesting cover from fire, traffic, grazing, mowing, or other disturbance until August 1. Warm-season grasses thrive under a system of periodic prescribed burning. Any existing woody cover should be protected from fire and grazing. Establishing hedgerows and windbreaks of certain trees and shrubs can provide a source of food and roosting areas. Brush piles can be built for cover along fence rows and in odd-shaped areas that are inconvenient for cultivation. Leaving crop residue on the surface after harvest and leaving waste grain in the fields provide cover and food throughout the winter. Also, some areas that are near wildlife cover can be left unharvested.

Wildlife area 3 consists of the Senachwine-Russell and Weir-Stoy-Hickory associations. The soils are poorly drained to well drained and are on ground moraines and end moraines. This area has a wide range of slopes and relief and includes broad, nearly level interfluves dissected by numerous creeks, steep and very steep backslopes above the creeks, and areas subject to flooding adjacent to the creeks. Numerous ponds have also been constructed.

The soils were originally wooded, but most of the nearly level to moderately steep areas have been cleared for cultivation or pasture. The steep and very steep backslopes above the creeks and the narrow interfluves above the backslopes still support woodland. Some small patches of woodland remain in areas that are surrounded by cropland. In addition to cropland, pasture, and woodland, this wildlife area includes wetlands.

Wildlife area 3 supports a variety of openland, wetland, and woodland wildlife. Examples are deer, squirrels, raccoons, rabbits, bobwhite quail, muskrats, frogs, snakes, hawks, owls, and many other types of birds and animals.

Wildlife area 3 is well suited to habitat for woodland wildlife. Measures that improve the habitat for woodland wildlife include protecting native trees, shrubs, and prairie plants from grazing by livestock and from uncontrolled fire and establishing

hedgerows, farm windbreaks, brush piles, food plots, and strips of grass or grass-legume mixtures to provide additional food and cover. Plantings for food and cover may be difficult to establish and maintain in the sloping areas because of the slope and the hazard of erosion. Food plots of grain or seed crops should be established in the less sloping areas. Planting on the contour reduces the hazard of erosion. Leaving dead trees as den sites for raccoon, woodpeckers, opossum, and other cavity-dwelling species also improves the habitat.

Poorly drained soils in wildlife area 3 are well suited to habitat for wetland wildlife. Some soils, such as Russell and Stoy soils, are well suited to habitat for openland wildlife.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered ***slight*** if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; ***moderate*** if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and ***severe*** if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth

to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and ***small commercial buildings*** are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered ***slight*** if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; ***moderate*** if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and ***severe*** if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfill. A rating of ***good*** indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; ***fair*** indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and ***poor*** indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated ***good, fair,*** or ***poor*** as a source of roadfill and topsoil. They are rated as a ***probable*** or ***improbable*** source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated ***good*** contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less.

Depth to the water table is more than 3 feet. Soils rated ***fair*** are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated ***poor*** have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and ***gravel*** are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated ***good*** have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated ***fair*** are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated ***poor*** are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered ***slight*** if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; ***moderate*** if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and ***severe*** if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

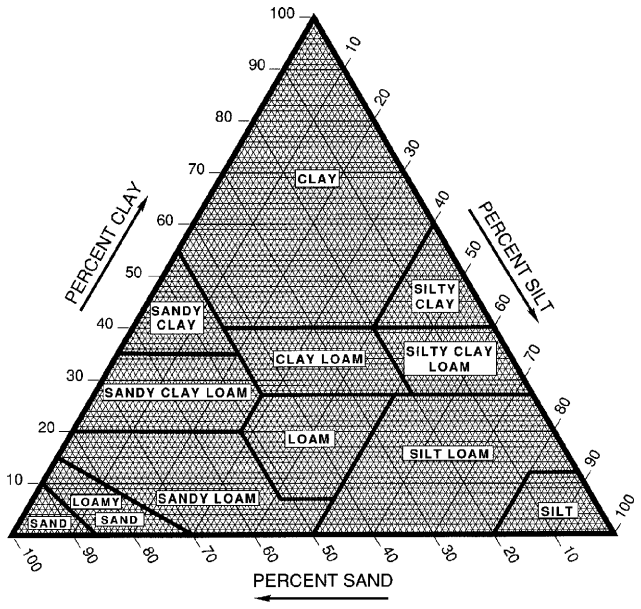

Figure 15.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 15). "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1986).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and

OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 18.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and ***plasticity index*** (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an

estimate of the quantity of water actually available to plants at any given time.

Cation-exchange capacity is the total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. It is a measurement of the nutrient-holding capacity of the soil.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are ***low***, a change of less than 3 percent; ***moderate***, 3 to 6 percent; ***high***, more than 6 percent; and ***very high***, greater than 9 percent.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. The soils assigned to group 1 are the most susceptible to soil blowing, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.
8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low

runoff potential) when thoroughly wet. These consist mainly of very deep or deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep to very deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 17, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. ***None*** means that flooding is not probable; ***rare*** that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); ***occasional*** that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and ***frequent*** that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). Duration is expressed as ***very brief*** if less than 2 days, ***brief*** if 2 to 7 days, ***long*** if 7 days to 1 month, and ***very long*** if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An ***apparent*** water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A ***perched*** water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. “More than 6.0” indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 60 inches. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves

into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as ***low, moderate,*** or ***high,*** is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as ***low, moderate,*** or ***high***. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section “Soil Series and Their Morphology.” The soil samples were tested by the Illinois Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); and Moisture density—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA, 1975). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in ***sol***. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (***Ud***, meaning humid, plus ***alf***, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (***Hapl***, meaning minimal horizonation, plus ***udalf***, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective ***Typic*** identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, mesic Typic Hapludalfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (USDA, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA, 1975) and in "Keys to Soil Taxonomy" (USDA, 1998). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Atlas Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Very slow
Landform: Ground moraines

Landform position: Backslopes
Parent material: Loess and the underlying till that contains a strongly developed paleosol
Slope range: 10 to 18 percent
Taxonomic classification: Fine, smectitic, mesic Aeric Chromic Vertic Epiaqualfs

Typical Pedon

Atlas silt loam, 10 to 18 percent slopes, eroded, 2,600 feet east and 265 feet north of the southwest corner of sec. 14, T. 12 N., R. 13 W.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; many very fine roots; moderately acid; clear smooth boundary.

2Bt—5 to 13 inches; brown (10YR 5/3) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many faint brown (10YR 4/3) clay films on faces of peds; about 5 percent fine gravel; slightly acid; clear smooth boundary.

2Btg1—13 to 24 inches; grayish brown (10YR 5/2) clay loam; moderate medium and coarse prismatic structure; firm; few very fine and few medium roots; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct brown (7.5YR 4/4) masses of iron accumulation in the matrix; about 5 percent fine gravel; slightly acid; clear smooth boundary.

2Btg2—24 to 35 inches; light brownish gray (10YR 6/2) clay loam; moderate medium and coarse prismatic structure; firm; few very fine and fine roots; common faint gray (10YR 5/1) and grayish brown (10YR 5/2) clay films on faces of peds; common fine and medium distinct brown (7.5YR 4/4) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 5 percent fine gravel; strongly acid; clear smooth boundary.

2Btg3—35 to 47 inches; gray (5Y 6/1) clay loam; moderate medium and coarse prismatic structure; firm; few very fine roots; common faint grayish brown (10YR 5/2) clay films on faces of peds; common fine and medium prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 5 percent fine gravel; moderately acid; clear smooth boundary.

2BCg—47 to 60 inches; light brownish gray (10YR 6/2) clay loam; moderate medium and coarse prismatic structure; firm; few very fine roots; common fine and medium prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 5 percent fine gravel; slightly acid.

Range in Characteristics

Thickness of the loess: 5 to 11 inches

Ap horizon:
Hue—10YR
Value—4
Chroma—2 or 3
Texture—silt loam

2Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—clay loam, silty clay loam, silty clay, or clay

2Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—clay loam, silty clay loam, silty clay, or clay

2BCg horizon:
Hue—10YR or 2.5Y
Value—6
Chroma—2
Texture—clay loam

Blair Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landform: Ground moraines
Landform position: Backslopes
Parent material: Loess and/or water-worked sediments and the underlying till that contains a strongly developed paleosol
Slope range: 5 to 10 percent
Taxonomic classification: Fine-silty, mixed, mesic Aquic Hapludalfs

Typical Pedon

Blair silt loam, 5 to 10 percent slopes, eroded, 1,875 feet east and 1,150 feet north of the southwest corner of sec. 5, T. 12 N., R. 11 W.

Ap—0 to 5 inches; dark yellowish brown (10YR 4/4)

silt loam, light yellowish brown (10YR 6/4) dry; weak fine and medium subangular blocky structure parting to moderate fine granular; friable; many very fine roots; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; abrupt smooth boundary.

Bt—5 to 10 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium angular blocky structure; firm; common very fine roots throughout; many faint brown (10YR 5/3) clay films and many faint pale brown (10YR 6/3) clay depletions on faces of peds; many medium distinct yellowish brown (10YR 5/6) masses of iron accumulation and common medium distinct light brownish gray (2.5Y 6/2) iron depletions in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules and moderately cemented concretions of iron and manganese oxide throughout; very strongly acid; clear smooth boundary.

Btg1—10 to 19 inches; light brownish gray (2.5Y 6/2) silty clay loam; moderate medium and coarse prismatic structure parting to moderate medium angular blocky; very firm; common very fine roots; common distinct brown (10YR 5/3) clay films and few faint pale brown (10YR 6/3) clay depletions on faces of peds; many medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules and moderately cemented concretions of iron and manganese oxide throughout; very strongly acid; gradual wavy boundary.

Btg2—19 to 33 inches; light brownish gray (2.5Y 6/2) silty clay loam; moderate medium and coarse prismatic structure parting to moderate medium angular blocky; very firm; few very fine roots; common distinct brown (10YR 5/3) and common faint gray (10YR 6/1) clay films and few faint pale brown (10YR 6/3) clay depletions on faces of peds; many medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules and moderately cemented concretions of iron and manganese oxide throughout; strongly acid; gradual wavy boundary.

2Btg3—33 to 49 inches; gray (10YR 6/1) silty clay loam; moderate coarse prismatic structure; firm; few very fine roots; common faint gray (10YR 5/1) and few faint grayish brown (10YR 5/2) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; gradual wavy boundary.

2Btg4—49 to 60 inches; gray (10YR 5/1) clay loam; weak coarse prismatic structure; firm; few faint dark gray (10YR 4/1) clay films on faces of peds; many medium and coarse prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 1 percent fine gravel; neutral.

Range in Characteristics

Thickness of the loess: Less than 20 inches
Thickness of the water-worked sediments: Less than 50 inches
Depth to till: 20 to 50 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam

Bt, Btg, or 2Btg horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—1 to 4
Texture—silty clay loam, silt loam, or clay loam

Brenton Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Interfluves on outwash plains
Landform position: Summits
Parent material: Loess and the underlying outwash
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Aquic Argiudolls

Typical Pedon

Brenton silt loam, 0 to 2 percent slopes, 1,140 feet east and 800 feet south of the northwest corner of sec. 27, T. 16 N., R. 12 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine granular structure; friable; few very fine roots throughout; moderately acid; abrupt smooth boundary.

A—10 to 13 inches; very dark gray (10YR 3/1) silt

loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; few very fine roots; slightly acid; clear smooth boundary.

BA—13 to 17 inches; brown (10YR 5/3) silt loam; moderate fine subangular blocky structure; friable; few very fine roots; common prominent very dark gray (10YR 3/1) organic coatings on faces of peds; common fine distinct and prominent yellowish brown (10YR 5/6 and 5/8) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly acid; clear smooth boundary.

Bt1—17 to 30 inches; brown (10YR 5/3) silty clay loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; common faint dark grayish brown (10YR 4/2) clay films and few distinct very dark gray (10YR 3/1) organo-clay films on faces of peds; common fine prominent yellowish brown (10YR 5/8) masses of iron accumulation and few fine faint light brownish gray (10YR 6/2) iron depletions in the matrix; common fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly acid; clear smooth boundary.

2Bt2—30 to 36 inches; mottled brown (10YR 5/3) and light brownish gray (10YR 6/2) clay loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; common distinct gray (10YR 5/1) clay films and very few distinct very dark gray (10YR 3/1) organo-clay films on faces of peds; common fine and medium distinct and prominent yellowish brown (10YR 5/6 and 5/8) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; neutral; clear smooth boundary.

2Bt3—36 to 45 inches; yellowish brown (10YR 5/8) clay loam; weak medium subangular blocky structure; firm; few very fine roots; few distinct gray (10YR 5/1) clay films on faces of peds; common medium faint strong brown (7.5YR 5/8) masses of iron accumulation and common medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; common fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly alkaline; gradual wavy boundary.

2BC—45 to 52 inches; dark yellowish brown (10YR 4/4), stratified sandy loam and silt loam; weak coarse subangular blocky structure; friable; few distinct gray (10YR 5/1) clay films in root channels; gray (10YR 5/1) krotovina; common medium prominent strong brown (7.5YR 5/8) masses of iron accumulation and few medium distinct grayish brown (10YR 5/2) iron depletions in the matrix; common fine and medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly alkaline; gradual wavy boundary.

2C—52 to 60 inches; mixed strong brown (7.5YR 5/8) and light gray (2.5Y 7/2), stratified loam and silt loam; massive; friable; common medium distinct yellowish brown (10YR 5/8) masses of iron accumulation and common medium distinct light brownish gray (10YR 6/2) iron depletions in the matrix; common fine and medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly alkaline.

Range in Characteristics

Depth to carbonates: 40 inches or more
Thickness of the mollic epipedon: 10 to 15 inches
Thickness of the loess: 30 to 40 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Bt or BA horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silt loam

2Bt or 2BC horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 8
Texture—clay loam, loam, silty clay loam, or stratified silt loam, loam, and sandy loam

2C horizon:
Hue—10YR, 7.5YR, or 2.5Y
Value—5 to 7
Chroma—2 to 8
Texture—stratified loam, sandy loam, clay loam, sandy clay loam, or silt loam

Brouillett Series

Depth class: Very deep
Drainage class: Somewhat poorly drained

Permeability: Moderate
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-loamy, mixed, mesic Cumulic Hapludolls

Typical Pedon

Brouillett silt loam, 0 to 2 percent slopes, frequently flooded, 660 feet west and 330 feet south of the northeast corner of sec. 4, T. 15 N., R. 11 W.

A1—0 to 11 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine and medium granular structure; friable; many very fine roots; slightly alkaline; gradual wavy boundary.
A2—11 to 19 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate very fine and fine subangular blocky structure; friable; common very fine roots; slightly alkaline; gradual wavy boundary.
A3—19 to 26 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; friable; common very fine roots; slightly alkaline; clear wavy boundary.
Bg1—26 to 34 inches; dark grayish brown (10YR 4/2) silt loam; weak medium subangular blocky structure; friable; common very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly alkaline; gradual wavy boundary.
Bg2—34 to 42 inches; light brownish gray (2.5Y 6/2) silt loam; weak medium and coarse subangular blocky structure; friable; few very fine roots; few distinct very dark gray (10YR 3/1) organic coatings in root channels; many medium and coarse prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 2 percent fine gravel; slightly alkaline; gradual wavy boundary.
Cg—42 to 60 inches; light brownish gray (2.5Y 6/2), stratified silt loam and loam; massive; friable; few very fine roots; many medium and coarse prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 2 percent fine gravel; slightly alkaline.

Range in Characteristics

Depth to carbonates: 40 inches or more
Thickness of the mollic epipedon: 24 to 36 inches

A or Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Bg horizon:
Hue—2.5Y or 10YR
Value—4 to 6
Chroma—1 to 3
Texture—silt loam, loam, or clay loam

Cg horizon:
Hue—2.5Y or 10YR
Value—4 to 6
Chroma—1 to 3
Texture—stratified silt loam, loam, sandy loam, or clay loam

Camden Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Interfluves on outwash plains and stream terraces
Landform position: Summits and backslopes on outwash plains; treads and backslopes on terraces
Parent material: Loess and the underlying outwash
Slope range: 0 to 10 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Camden silt loam, 2 to 5 percent slopes, 1,200 feet east and 1,825 feet north of the southwest corner of sec. 9, T. 12 N., R. 12 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; moderate fine granular structure in the upper part and weak medium platy structure in the lower part; friable; common very fine roots; moderately acid; abrupt smooth boundary.
Bt1—7 to 10 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine and medium subangular blocky structure; friable; common very fine roots; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—10 to 15 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium and coarse subangular blocky structure parting to moderate fine subangular blocky; firm; common very fine and few fine roots; many faint dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—15 to 26 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine and few fine roots; many faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; very strongly acid; gradual smooth boundary.

Bt4—26 to 33 inches; yellowish brown (10YR 5/6) silty clay loam; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many distinct dark yellowish brown (10YR 4/4) clay films and few distinct very pale brown (10YR 7/3) clay depletions on faces of peds; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; very strongly acid; abrupt smooth boundary.

2Bt5—33 to 41 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate coarse subangular blocky structure; firm; common distinct dark yellowish brown (10YR 4/4) clay films and few distinct light gray (10YR 7/2) clay depletions on faces of peds; strongly acid; clear smooth boundary.

2Bt6—41 to 60 inches; yellowish brown (10YR 5/6 and 5/4) sandy loam; weak coarse subangular blocky structure; friable; few faint brown (7.5YR 4/4) clay films on faces of peds; strongly acid.

Range in Characteristics

Thickness of the loess: 24 to 40 inches

Ap horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 4
Texture—silt loam

BE or E horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture—silt loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam or silt loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—clay loam, sandy loam, sandy clay loam, silt loam, or loam

Catlin Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Parent material: Loess and the underlying till
Slope range: 2 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Oxyaquic Argiudolls

Typical Pedon

Catlin silt loam, 2 to 5 percent slopes, 50 feet east and 350 feet north of the southwest corner of sec. 34, T. 14 N., R. 12 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine and fine granular structure; friable; common very fine and fine roots; neutral; abrupt smooth boundary.

A—9 to 17 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common very fine and fine roots; neutral; abrupt smooth boundary.

Bt1—17 to 22 inches; brown (10YR 4/3) silty clay loam; moderate very fine and fine subangular blocky structure; firm; common very fine and fine roots; many distinct very dark grayish brown (10YR 3/2) and common distinct dark brown (10YR 3/3) organo-clay films on faces of peds; few fine prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; neutral; clear smooth boundary.

Bt2—22 to 28 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong fine subangular blocky structure; firm; common very fine and fine roots; common distinct very dark grayish brown (10YR 3/2) organo-clay films and many distinct brown (10YR 4/3) clay films on faces of peds; few medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; neutral; clear smooth boundary.

Bt3—28 to 39 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine and fine roots; common distinct very dark grayish brown (10YR 3/2) organo-clay films and many distinct brown (10YR 4/3) and dark grayish brown (10YR 4/2) clay films on faces of peds; common fine and medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; neutral; clear smooth boundary.

Bt4—39 to 46 inches; light olive brown (2.5Y 5/4) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine and fine roots; common distinct very dark grayish brown (10YR 3/2) organo-clay films and common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many medium distinct and prominent yellowish brown (10YR 5/6 and 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual smooth boundary.

2Bt5—46 to 51 inches; yellowish brown (10YR 5/4) clay loam; weak coarse subangular blocky structure; firm; few fine roots; few distinct very dark grayish brown (10YR 3/2) organo-clay films and few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few medium distinct grayish brown (10YR 5/2) iron depletions and common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 2 percent fine gravel; neutral; gradual smooth boundary.

2BC—51 to 57 inches; yellowish brown (10YR 5/4) loam; weak medium prismatic structure; firm; few fine roots; few medium distinct light brownish gray (10YR 6/2) iron depletions and common medium distinct dark yellowish brown (10YR 4/6) and prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 3 percent fine gravel; neutral; gradual smooth boundary.

2C—57 to 60 inches; yellowish brown (10YR 5/4) loam; massive; firm; few fine roots; few medium distinct light brownish gray (10YR 6/2) iron depletions and common medium prominent yellowish brown (10YR 5/8) and distinct dark yellowish brown (10YR 4/6) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 5 percent fine gravel; slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 45 inches or more
Thickness of the mollic epipedon: 10 to 17 inches
Thickness of the loess: 40 to 55 inches

Ap or A horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silt loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silt loam

2Bt or 2BC horizon:
Hue—10YR
Value—5
Chroma—4 to 6
Texture—clay loam or loam

2C horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—3 to 6
Texture—loam or clay loam

Cowden Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Slow
Landform: Interfluves on ground moraines
Landform position: Summits
Parent material: Loess
Slope range: 0 to 2 percent
Taxonomic classification: Fine, smectitic, mesic Vertic Albaqualfs

Typical Pedon

Cowden silt loam, 0 to 2 percent slopes, 265 feet east and 190 feet south of the center of sec. 14, T. 12 N., R. 13 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to moderate very fine and fine granular; friable;

common very fine roots; common fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly acid; abrupt smooth boundary.

Eg—8 to 17 inches; gray (10YR 5/1) silt loam; moderate thin and medium platy structure; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds and in pores; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; moderately acid; clear smooth boundary.

Btg1—17 to 24 inches; gray (10YR 5/1) silty clay; moderate medium prismatic structure parting to moderate fine and medium angular blocky; firm; few very fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; very strongly acid; clear smooth boundary.

Btg2—24 to 33 inches; light brownish gray (2.5Y 6/2) silty clay; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few very fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; very strongly acid; gradual smooth boundary.

Btg3—33 to 46 inches; gray (10YR 6/1) silty clay loam; moderate medium and coarse prismatic structure; firm; few very fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organo-clay films in root channels and pores; many medium prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; very strongly acid; gradual smooth boundary.

Btg4—46 to 55 inches; gray (10YR 6/1) silt loam; moderate coarse prismatic structure; firm; few very fine roots; few distinct dark gray (10YR 4/1) clay films on faces of peds; few distinct very dark gray (10YR 3/1) organo-clay films in root channels and pores; many coarse prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly acid; gradual smooth boundary.

Btg5—55 to 60 inches; gray (10YR 6/1) silt loam; weak coarse prismatic structure; friable; few distinct gray (10YR 5/1) clay films on faces of peds; few distinct dark gray (10YR 4/1) clay films and few distinct very dark gray (10YR 3/1) organo-clay films in root channels and pores; many medium and coarse prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; neutral.

Range in Characteristics

Thickness of the loess: 55 inches or more
Other features: Some pedons are underlain by till that contains a strongly developed paleosol between a depth of 55 and 60 inches.

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silt loam

Eg horizon:
Hue—10YR
Value—4 to 6
Chroma—1 or 2
Texture—silt loam

Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silty clay or silty clay loam in the upper part and silty clay loam or silt loam in the lower part

Dana Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderately slow
Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Parent material: Loess and the underlying till
Slope range: 2 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Oxyaquic Argiudolls

Typical Pedon

Dana silt loam, 2 to 5 percent slopes, 1,350 feet east and 550 feet south of the northwest corner of sec. 34, T. 14 N., R. 12 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate very fine and fine granular structure; friable; common fine roots; moderately acid; clear smooth boundary.

A—7 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; common fine roots; moderately acid; abrupt smooth boundary.

Bt1—12 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine and fine subangular blocky structure; friable; few fine roots; many distinct dark brown (10YR 3/3) organo-clay films and common faint brown (10YR 4/3) clay films on faces of peds; few fine prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

Bt2—18 to 29 inches; brown (10YR 5/3) silty clay loam; weak medium subangular blocky structure parting to moderate fine subangular blocky; firm; few fine roots; few distinct dark brown (10YR 3/3) organo-clay films and many distinct brown (10YR 4/3) clay films on faces of peds; common fine distinct and prominent yellowish brown (10YR 5/6 and 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; clear smooth boundary.

2Bt3—29 to 46 inches; yellowish brown (10YR 5/4) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine and fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; black (10YR 2/1) krotovina; common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation and few medium distinct grayish brown (10YR 5/2) iron depletions in the matrix; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 2 percent fine gravel; neutral; gradual smooth boundary.

2BC—46 to 52 inches; yellowish brown (10YR 5/4) loam; weak coarse subangular blocky structure; firm; few very fine roots; common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation and few medium distinct light brownish gray (10YR 6/2) iron depletions in the matrix; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 5 percent fine gravel; slightly effervescent; slightly alkaline; gradual smooth boundary.

2C—52 to 60 inches; yellowish brown (10YR 5/4) loam; massive; firm; few medium distinct olive yellow (2.5Y 6/6) and common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation and common medium distinct light brownish gray (10YR 6/2) iron depletions in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 5 percent fine gravel; strongly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 40 inches or more
Thickness of the mollic epipedon: 10 to 16 inches
Thickness of the loess: 22 to 40 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam

2Bt or 2BC horizon:
Hue—10YR
Value—4 or 5
Chroma—4
Texture—clay loam or loam

2C horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—loam

Drummer Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform: Interfluves, depressions, and drainageways on outwash plains, ground moraines, and end moraines
Landform position: Summits on interfluves; toeslopes in depressions and drainageways

Parent material: Loess and the underlying outwash
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Endoaquolls

Typical Pedon

Drummer silty clay loam, 0 to 2 percent slopes, 2,400 feet east and 2,550 feet south of the northwest corner of sec. 4, T. 13 N., R. 12 W.

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate very fine subangular blocky structure in the upper part and moderate medium angular blocky structure in the lower part; friable; common very fine roots; slightly acid; abrupt smooth boundary.

A—7 to 13 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure; firm; common very fine and fine roots; slightly acid; clear smooth boundary.

Btg1—13 to 20 inches; gray (10YR 5/1) silty clay loam; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine and fine and few medium roots; common distinct black (10YR 2/1) organo-clay films and common distinct dark gray (10YR 4/1) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; clear smooth boundary.

Btg2—20 to 29 inches; gray (10YR 5/1) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; common distinct very dark gray (10YR 3/1) organo-clay films and common distinct dark gray (10YR 4/1) clay films on faces of peds; many fine and medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual smooth boundary.

Btg3—29 to 37 inches; gray (10YR 5/1) silty clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common very fine roots; common distinct very dark gray (10YR 3/1) organo-clay films and common distinct dark gray (10YR 4/1) clay films on faces of peds; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual smooth boundary.

Btg4—37 to 46 inches; gray (10YR 5/1) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; common distinct very dark gray (10YR 3/1) organo-clay films on faces of peds; common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; clear smooth boundary.

2Btg5—46 to 56 inches; gray (5Y 5/1) silt loam; weak coarse subangular blocky structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organo-clay films in root channels; common medium prominent yellowish brown (10YR 5/8) and few fine prominent brown (10YR 4/3) masses of iron accumulation in the matrix; about 1 percent fine gravel; neutral; gradual smooth boundary.

2Cg—56 to 60 inches; gray (5Y 5/1), stratified silt loam and loam; massive; friable; many medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; about 3 percent fine gravel; slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 40 inches or more
Thickness of the mollic epipedon: 10 to 24 inches
Thickness of the loess: 40 to 60 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silty clay loam

Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 6
Chroma—1 or 2
Texture—silty clay loam or silt loam

2Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silt loam or loam; stratified with silty clay loam, clay loam, or sandy loam in some pedons

2Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 to 6
Texture—stratified loam, silt loam, sandy loam, clay loam, or silty clay loam

Elburn Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Interfluves on outwash plains
Landform position: Summits
Parent material: Loess and the underlying outwash
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Aquic Argiudolls

Typical Pedon

Elburn silt loam, 0 to 2 percent slopes, 400 feet east and 550 feet south of the northwest corner of sec. 26, T. 16 N., R. 13 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak medium subangular blocky structure parting to moderate medium granular; friable; few very fine roots; slightly acid; clear smooth boundary.

A—10 to 15 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; few very fine roots; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual wavy boundary.

Bt1—15 to 21 inches; brown (10YR 4/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organo-clay films and few faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine faint yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; moderately acid; gradual wavy boundary.

Bt2—21 to 25 inches; brown (10YR 5/3) silty clay loam; moderate medium prismatic structure; firm; few very fine roots throughout; few distinct very dark grayish brown (10YR 3/2) organo-clay films and common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine faint light brownish gray (2.5Y 6/2) iron depletions and few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; moderately acid; gradual wavy boundary.

Bt3—25 to 36 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium and coarse prismatic structure; firm; few very fine roots throughout; common distinct very dark grayish brown (10YR 3/2) organo-clay films and common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common medium distinct light brownish gray (2.5Y 6/2) iron depletions and common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; clear wavy boundary.

Bt4—36 to 44 inches; yellowish brown (10YR 5/4) silty clay loam; moderate coarse prismatic structure; firm; few distinct very dark grayish brown (10YR 3/2) organo-clay films on faces of peds and in root channels; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common medium distinct light brownish gray (2.5Y 6/2) iron depletions and common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; clear smooth boundary.

2Btg—44 to 51 inches; light brownish gray (2.5Y 6/2) silt loam; weak coarse subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) organo-clay films and few distinct dark grayish brown (10YR 4/2) clay films in root channels; many medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; about 30 percent fine sand; neutral; abrupt smooth boundary.

2C—51 to 60 inches; yellowish brown (10YR 5/6), stratified sandy loam and loamy sand; massive; very friable; few medium prominent light brownish gray (2.5Y 6/2) iron depletions in the matrix; slightly alkaline.

Range in Characteristics

Depth to carbonates: 50 inches or more
Thickness of the mollic epipedon: 10 to 18 inches
Thickness of the loess: 40 to 55 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam or silt loam

2Btg horizon:
Hue—10YR or 2.5Y

Value—4 to 6
Chroma—2 to 8
Texture—silt loam, clay loam, loam, or sandy loam or stratified with these textures

2C or 2Cg horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—2 to 6
Texture—sandy loam or loam that commonly has strata of loamy sand or silt loam

Fincastle Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Interfluves on end moraines and ground moraines
Landform position: Summits
Parent material: Loess and the underlying till
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Aeric Epiaqualfs

Typical Pedon

Fincastle silt loam, 0 to 2 percent slopes, 1,000 feet west and 1,950 feet north of the southeast corner of sec. 30, T. 15 N., R. 11 W.

Ap—0 to 9 inches; brown (10YR 5/3) silt loam, light yellowish brown (10YR 6/4) dry; weak medium platy structure parting to moderate fine and medium granular; very friable; many very fine roots; few fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly alkaline; abrupt smooth boundary.

E—9 to 14 inches; light brownish gray (10YR 6/2) silt loam; weak medium platy structure; friable; common very fine roots; many medium faint brown (10YR 5/3) and few medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; neutral; abrupt smooth boundary.

Bt1—14 to 20 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong fine and medium angular blocky structure; firm; common very fine roots; many distinct grayish brown (10YR 5/2) clay films and common faint light gray (10YR 7/1) clay depletions on faces of peds; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), moderately cemented concretions and weakly cemented nodules of iron and manganese oxide throughout; very strongly acid; clear smooth boundary.

Bt2—20 to 34 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; many distinct grayish brown (10YR 5/2) clay films and common faint light gray (10YR 7/2) clay depletions on faces of peds; few distinct black (10YR 2/1) stains of manganese oxides on faces of peds; common fine to coarse rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; very strongly acid; gradual smooth boundary.

2Bt3—34 to 47 inches; yellowish brown (10YR 5/6) clay loam; weak coarse prismatic structure; firm; few very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; many medium and coarse prominent light brownish gray (10YR 6/2) iron depletions in the matrix; common fine to coarse rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; about 5 percent fine gravel; strongly acid; gradual smooth boundary.

2Bt4—47 to 60 inches; yellowish brown (10YR 5/6) loam; weak coarse subangular blocky structure; friable; few distinct dark grayish brown (10YR 4/2) clay films in root channels and pores; many fine and medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; common medium irregular black (10YR 2/1), weakly cemented nodules and few fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; about 5 percent fine gravel; slightly acid.

Range in Characteristics

Depth to carbonates: 40 inches or more
Thickness of the loess: 22 to 40 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam

E horizon:
Hue—10YR
Value—5 or 6
Chroma—2
Texture—silt loam

Bt horizon:
Hue—10YR

Value—4 to 6
Chroma—2 to 6
Texture—silty clay loam or silt loam

2Bt horizon:
Hue—10YR
Value—4 to 6
Chroma—2 to 6
Texture—clay loam or loam

Flanagan Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landform: Interfluves on ground moraines
Landform position: Summits
Parent material: Loess and the underlying till
Slope range: 0 to 2 percent
Taxonomic classification: Fine, smectitic, mesic Aquertic Argiudolls

Typical Pedon

Flanagan silt loam, 0 to 2 percent slopes, 100 feet east and 1,250 feet north of the southwest corner of sec. 34, T. 14 N., R. 12 W.

Ap—0 to 11 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak coarse subangular blocky structure parting to moderate medium granular; friable; common very fine and few fine roots; slightly acid; abrupt smooth boundary.

A—11 to 18 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine subangular blocky structure parting to moderate medium granular; friable; few very fine roots; neutral; gradual smooth boundary.

Bt1—18 to 30 inches; brown (10YR 4/3) silty clay; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many distinct very dark gray (10YR 3/1) organo-clay films and common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly acid; clear smooth boundary.

Bt2—30 to 43 inches; brown (10YR 5/3) silty clay loam; moderate medium and coarse prismatic structure; firm; few very fine roots; common distinct very dark gray (10YR 3/1) organo-clay films on faces of peds and in root channels and many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine and medium distinct and prominent yellowish brown (10YR 5/6 and 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly acid; gradual smooth boundary.

Btg1—43 to 53 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate coarse prismatic structure; firm; few very fine roots; few distinct very dark gray (10YR 3/1) organo-clay films on faces of peds and in root channels and common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6 and 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; neutral; gradual smooth boundary.

2Btg2—53 to 60 inches; grayish brown (2.5Y 5/2) clay loam; moderate coarse subangular blocky structure; firm; few distinct very dark gray (10YR 3/1) organo-clay films in root channels; many medium prominent yellowish brown (10YR 5/6 and 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; about 1 percent fine gravel; slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 44 to 58 inches
Thickness of the mollic epipedon: 11 to 18 inches
Thickness of the loess: 40 to 55 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam or silty clay loam

Bt or Btg horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—silty clay loam or silty clay

2Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 to 6
Texture—clay loam, loam, silty clay loam, or silt loam

Genesee Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic class: Fine-loamy, mixed, mesic Fluventic Eutrudepts

Typical Pedon

Genesee sandy loam, 0 to 2 percent slopes, occasionally flooded, 1,400 feet west and 1,600 feet south of the northeast corner of sec. 27, T. 13 N., R. 11 W.

Ap—0 to 7 inches; brown (10YR 4/3) sandy loam, brown (10YR 5/3) dry; moderate fine granular structure; very friable; common very fine roots; neutral; abrupt smooth boundary.
Bw1—7 to 24 inches; brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 3/3) organic coatings on faces of peds; slightly alkaline; gradual smooth boundary.
Bw2—24 to 46 inches; brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 3/3) organic coatings on faces of peds; very slightly effervescent; slightly alkaline; gradual smooth boundary.
Bw3—46 to 60 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; few very fine and fine roots; many distinct dark brown (10YR 3/3) organic coatings on faces of peds; common medium distinct dark yellowish brown (10YR 4/6) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; very slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches

Ap horizon:
Hue—10YR
Value—3 to 5
Chroma—2 to 4
Texture—sandy loam

Bw horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or loam; strata of sandy loam, loamy sand, or sand below a depth of 50 inches in some pedons

Gosport Series

Depth class: Moderately deep
Drainage class: Moderately well drained
Permeability: Very slow
Landform: End moraines and ground moraines
Landform position: Backslopes
Parent material: Till and the underlying shale residuum
Slope range: 18 to 50 percent
Taxonomic classification: Fine, illitic, mesic Oxyaquic Dystrudepts

Typical Pedon

Gosport silt loam, 18 to 35 percent slopes, 1,190 feet west and 1,900 feet south of the northeast corner of sec. 3, T. 14 N., R. 11 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; many very fine roots; about 2 percent fine gravel; very strongly acid; clear wavy boundary.
2Bw1—4 to 12 inches; brown (10YR 5/3) clay; weak fine and medium subangular blocky structure; firm; few very fine to medium roots; few fine prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; about 5 percent shale channers; very strongly acid; gradual wavy boundary.
2Bw2—12 to 20 inches; brown (10YR 5/3) silty clay; weak medium subangular blocky structure; firm; few very fine to medium roots; few fine distinct gray (10YR 6/1) iron depletions in the matrix; about 5 percent shale channers; very strongly acid; gradual wavy boundary.
2Bw3—20 to 26 inches; brown (10YR 5/3) clay; weak medium and coarse subangular blocky structure; very firm; few fine and medium roots; common medium distinct gray (10YR 6/1) and few fine prominent greenish gray (5BG 6/1) iron depletions in the matrix; very strongly acid; gradual wavy boundary.
2Cr—26 to 60 inches; brown (10YR 5/3) and gray (N 6/0), weathered shale bedrock.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the till: Less than 15 inches

A horizon:
Hue—10YR

Value—3 or 4
Chroma—2
Texture—silt loam or loam

2Bw horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam, silty clay, or clay

2Cr horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 4

Harpster Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform: Interfluves and depressions on outwash plains and ground moraines
Landform position: Summits on interfluves; toeslopes in depressions
Parent material: Calcareous loess
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mesic Typic Calciaquolls

Typical Pedon

Harpster silty clay loam, 0 to 2 percent slopes, 1,000 feet east and 650 feet south of the northwest corner of sec. 32, T. 18 N., R. 13 W.

Apk—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak very fine granular structure; friable; common (about 8 percent) fine irregular white (10YR 8/1), moderately cemented concretions of calcium carbonate throughout; common small snail-shell fragments; violently effervescent; moderately alkaline; abrupt smooth boundary.

Ak—8 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common (about 8 percent) fine irregular white (10YR 8/1), moderately cemented concretions of calcium carbonate throughout; common small snail-shell fragments; violently effervescent; moderately alkaline; abrupt smooth boundary.

BAk—12 to 20 inches; dark gray (10YR 4/1) silty clay loam; moderate fine subangular blocky structure; friable; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; common (about 8 percent) fine irregular white (10YR 8/1), moderately cemented concretions of calcium carbonate throughout; common small snail-shell fragments; violently effervescent; moderately alkaline; clear smooth boundary.

Bg1—20 to 26 inches; dark gray (10YR 4/1) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; many fine distinct yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; few fine irregular white (10YR 8/1), moderately cemented concretions of calcium carbonate throughout; slightly effervescent; slightly alkaline; gradual smooth boundary.

Bg2—26 to 35 inches; gray (2.5Y 5/1) silty clay loam; moderate medium prismatic structure; firm; common faint gray (10YR 5/1) coatings on faces of peds; many medium prominent yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; few fine irregular white (10YR 8/1), moderately cemented concretions of calcium carbonate throughout; slightly effervescent; slightly alkaline; gradual smooth boundary.

BCg—35 to 41 inches; gray (2.5Y 6/1) silt loam; weak medium prismatic structure; friable; few faint gray (10YR 5/1) coatings on faces of peds; many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine irregular white (10YR 8/1), moderately cemented concretions of calcium carbonate throughout; strongly effervescent; moderately alkaline; diffuse smooth boundary.

2Cg—41 to 60 inches; gray (2.5Y 6/1) silt loam; massive; friable; many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine irregular white (10YR 8/1), moderately cemented concretions of calcium carbonate throughout; about 25 percent sand; about 1 percent fine gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to the calcic horizon: Less than 16 inches
Thickness of the mollic epipedon: 11 to 16 inches

Apk or Ak horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam

Bg or BCg horizon:
Hue—10YR, 2.5Y, or neutral
Value—4 to 6

Chroma—0 to 2
Texture—silty clay loam or silt loam

2Cg or Cg horizon:
Hue—10YR, 2.5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—silt loam, loam, sandy loam, or clay loam

Harvard Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Interfluves on outwash plains
Landform position: Summits and backslopes
Parent material: Loess and the underlying outwash
Slope range: 2 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Mollic Hapludalfs

Typical Pedon

Harvard silt loam, 2 to 5 percent slopes, 2,050 feet east and 800 feet north of the southwest corner of sec. 26, T. 15 N., R. 14 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; friable; few very fine roots; moderately acid; abrupt smooth boundary.

Bt1—9 to 12 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine and fine subangular blocky structure; friable; few very fine roots; few faint very dark grayish brown (10YR 3/2) organo-clay films and few faint brown (10YR 4/3) clay films on faces of peds; slightly acid; abrupt smooth boundary.

Bt2—12 to 17 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; few faint very dark grayish brown (10YR 3/2) organo-clay films and few faint brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—17 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; few faint very dark grayish brown (10YR 3/2) organo-clay films and few faint brown (10YR 4/3) clay films on faces of peds; moderately acid; abrupt smooth boundary.

2Bt4—26 to 31 inches; dark yellowish brown (10YR 4/6) clay loam; moderate medium subangular blocky structure; firm; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organo-clay films and few distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

2BC—31 to 38 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; few very fine roots; few distinct brown (10YR 4/3) clay films in pores; moderately acid; gradual wavy boundary.

2C—38 to 60 inches; mixed brownish yellow (10YR 6/6) and dark yellowish brown (10YR 4/6), stratified sandy loam and loamy sand; single grain; loose; few very fine roots; moderately acid.

Range in Characteristics

Thickness of the loess: 24 to 40 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—2 or 3
Texture—silt loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silt loam

2Bt or 2BC horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—3 to 6
Texture—clay loam, loam, sandy clay loam, or sandy loam

2C horizon:
Hue—10YR
Value—5 or 6
Chroma—3 to 6
Texture—stratified loam, sandy clay loam, very fine sandy loam, sandy loam, or loamy sand

Hickory Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Ground moraines
Landform position: Backslopes
Parent material: Till
Slope range: 18 to 60 percent
Taxonomic classification: Fine-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Hickory loam, 18 to 35 percent slopes, 2,300 feet west

and 1,860 feet north of the southeast corner of sec. 17, T. 12 N., R. 12 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; moderate very fine and fine granular structure; friable; few very fine and fine roots; slightly acid; abrupt smooth boundary.

E—4 to 8 inches; light yellowish brown (10YR 6/4) loam; weak medium platy structure; friable; few very fine and fine roots; moderately acid; abrupt smooth boundary.

Bt1—8 to 20 inches; yellowish brown (10YR 5/4) clay loam; moderate fine and medium subangular blocky structure; firm; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; about 1 percent fine gravel; very strongly acid; clear smooth boundary.

Bt2—20 to 34 inches; yellowish brown (10YR 5/4) clay loam; moderate medium prismatic structure; firm; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films and few faint pale brown (10YR 6/3) clay depletions on faces of peds; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation and few fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; common fine irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; the iron depletions are relict redoximorphic features; about 2 percent fine gravel; very strongly acid; gradual smooth boundary.

Bt3—34 to 48 inches; yellowish brown (10YR 5/4) clay loam; moderate coarse subangular blocky structure; firm; few fine and medium roots; common distinct dark brown (10YR 3/3) and dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation and few fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; common medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; the iron depletions are relict redoximorphic features; about 2 percent fine gravel; neutral; clear smooth boundary.

C—48 to 60 inches; brown (10YR 5/3) loam; moderate medium and coarse prismatic structure in soil fragments; friable; few fine and medium roots; common coarse prominent strong brown (7.5YR 5/8), common medium faint brown (10YR 4/3), and common fine and medium distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common medium and coarse irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 2 percent fine gravel; very slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 40 to 55 inches

A horizon:
Hue—10YR
Value—3 or 4
Chroma—2 or 3
Texture—loam

E horizon:
Hue—10YR
Value—4 to 6
Chroma—3 or 4
Texture—loam

Bt horizon:
Hue—10YR, 7.5YR, or 2.5Y
Value—4 to 6
Chroma—3 to 6
Texture—commonly clay loam; silty clay loam or loam in some subhorizons

C horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—3 to 6
Texture—loam or clay loam

Hosmer Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate in the upper part and very slow in the lower part
Landform: Interfluves on ground moraines
Landform position: Summits and backslopes
Parent material: Loess
Slope range: 2 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Oxyaquic Fragiudalfs

Typical Pedon

Hosmer silt loam, 2 to 5 percent slopes, 2,500 feet east and 1,700 feet north of the southwest corner of sec. 17, T. 12 N., R. 12 W.

A—0 to 4 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; many very fine and fine roots; slightly acid; abrupt smooth boundary.

E—4 to 10 inches; yellowish brown (10YR 5/4) silt loam; moderate medium platy structure; friable;

common very fine roots; moderately acid; abrupt smooth boundary.

Bt1—10 to 21 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; many distinct brown (7.5YR 4/4) clay films and common distinct light yellowish brown (10YR 6/4) clay depletions on faces of peds; very strongly acid; clear smooth boundary.

Bt2—21 to 31 inches; yellowish brown (10YR 5/6) silty clay loam; weak fine prismatic structure parting to moderate fine subangular blocky; firm; few very fine roots; many distinct brown (7.5YR 4/4) clay films on faces of peds; many distinct pale brown (10YR 6/3) clay depletions on faces of peds in the upper part; common distinct pale brown (10YR 6/3) clay depletions on faces of peds in the lower part; very strongly acid; clear smooth boundary.

Bt3—31 to 38 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; many distinct brown (7.5YR 4/4) clay films and many distinct pale brown (10YR 6/3) clay depletions on faces of peds; common fine distinct strong brown (7.5YR 5/8) masses of iron accumulation and common medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; strongly acid; gradual smooth boundary.

Btx1—38 to 50 inches; yellowish brown (10YR 5/6) silt loam; moderate coarse prismatic structure; firm; common distinct brown (7.5YR 4/4) clay films on faces of peds and many prominent very pale brown (10YR 7/3) clay depletions on vertical faces of peds; common fine distinct strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; brittle in about 70 percent of the volume; about 10 percent fine sand; strongly acid; gradual smooth boundary.

Btx2—50 to 60 inches; yellowish brown (10YR 5/6) silt loam; moderate coarse prismatic structure in the upper part and weak thick platy structure in the lower part; firm; common distinct brown (7.5YR 4/4) clay films and many prominent very pale brown (10YR 7/3) clay depletions on faces of peds; common medium prominent light brownish gray (10YR 6/2) iron depletions and common fine distinct strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; brittle in about 60 percent of the volume; about 15 percent fine sand; strongly acid.

Range in Characteristics

Depth to the fragipan: 30 to 38 inches

Other features: Within a depth of 45 inches, the loess averages less than 10 percent fine sand. Below a depth of 45 inches, the content of fine sand generally increases and ranges from 10 to 20 percent.

A horizon:
Hue—10YR
Value—3 to 5
Chroma—2 or 3
Texture—silt loam

E horizon:
Hue—10YR
Value—5
Chroma—4 to 6
Texture—silt loam

Bt or Btx horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—silt loam or silty clay loam

Kendall Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Interfluves on outwash plains and stream terraces
Landscape position: Summits on outwash plains; treads on stream terraces
Parent material: Loess and the underlying outwash
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Aeric Endoaqualfs

Typical Pedon

Kendall silt loam, 0 to 2 percent slopes, 2,175 feet east and 1,450 feet north of the southwest corner of sec. 18, T. 12 N., R. 13 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; few very fine roots; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; abrupt smooth boundary.

E—9 to 12 inches; brown (10YR 5/3) silt loam; weak medium platy structure parting to moderate medium granular; friable; few very fine roots; many medium faint light brownish gray (10YR 6/2) iron depletions and common fine distinct and prominent yellowish brown (10YR 5/6 and 5/8) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; moderately acid; clear smooth boundary.

Bt—12 to 17 inches; brown (10YR 5/3) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common faint grayish brown (10YR 5/2) clay films and common faint light gray (10YR 7/1) clay depletions on faces of peds; many medium faint light brownish gray (10YR 6/2) iron depletions and common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; strongly acid; clear wavy boundary.

Btg1—17 to 25 inches; light brownish gray (10YR 6/2) silty clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few very fine roots; common distinct grayish brown (10YR 5/2) clay films and common faint light gray (10YR 7/1) clay depletions on faces of peds; common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; very strongly acid; gradual wavy boundary.

Btg2—25 to 32 inches; light brownish gray (2.5Y 6/2) silty clay loam; moderate medium and coarse prismatic structure; firm; few very fine roots; common distinct grayish brown (2.5Y 5/2) and many distinct gray (5Y 6/1) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; strongly acid; gradual wavy boundary.

Btg3—32 to 42 inches; light brownish gray (2.5Y 6/2) silty clay loam; moderate coarse prismatic structure; firm; few very fine roots; common distinct olive gray (5Y 5/2) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; strongly acid; clear wavy boundary.

2Btg4—42 to 54 inches; light brownish gray (2.5Y 6/2) silt loam; weak coarse subangular blocky structure parting to moderate medium platy; friable; few distinct gray (10YR 5/1) clay films on faces of peds and in root channels and pores; many medium and coarse prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; neutral; clear smooth boundary.

2Cg—54 to 60 inches; gray (10YR 5/1) sandy clay loam; massive; friable; many medium prominent brown (7.5YR 4/4) and common fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 12 percent fine gravel; neutral.

Range in Characteristics

Thickness of the loess: 40 to 60 inches

Ap horizon:
- Hue—10YR
- Value—4
- Chroma—2 or 3
- Texture—silt loam

E horizon:
- Hue—2.5Y or 10YR
- Value—5 or 6
- Chroma—2 or 3
- Texture—silt loam

Bt or Btg horizon:
- Hue—10YR, 2.5Y, or 5Y
- Value—5 or 6
- Chroma—1 to 4
- Texture—silty clay loam

2Btg horizon:
- Hue—10YR, 2.5Y, or 5Y
- Value—5 or 6
- Chroma—1 to 6
- Texture—silt loam, loam, or clay loam or stratified with these textures; thin strata of sandy loam or loamy sand in some pedons

2Cg horizon:
- Hue—10YR, 2.5Y, or 5Y
- Value—5 or 6

Chroma—1 to 3
Texture—sandy clay loam, silt loam, loam, sandy loam, or clay loam or stratified with these textures

Martinsville Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Outwash plains and stream terraces
Landform position: Backslopes
Parent material: Outwash
Slope range: 2 to 5 percent
Taxonomic classification: Fine-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Martinsville loam, 2 to 5 percent slopes, eroded, 2,100 feet east and 2,625 feet south of the northwest corner of sec. 13, T. 12 N., R. 12 W.

Ap—0 to 8 inches; brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; moderate very fine and fine granular structure; friable; common very fine roots; slightly acid; abrupt smooth boundary.
Bt1—8 to 14 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; firm; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; clear smooth boundary.
Bt2—14 to 21 inches; yellowish brown (10YR 5/4) clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; clear smooth boundary.
Bt3—21 to 36 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate medium and coarse prismatic structure; firm; few very fine roots; common distinct brown (7.5YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.
Bt4—36 to 48 inches; yellowish brown (10YR 5/4) sandy loam; weak coarse subangular blocky structure; friable; few very fine roots; common distinct brown (7.5YR 4/4) clay films on faces of peds; few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral; gradual smooth boundary.
C—48 to 60 inches; yellowish brown (10YR 5/4), stratified sandy loam and loam; massive; friable; few very fine roots; few distinct dark yellowish brown (10YR 4/4) clay films in pores; few fine faint brown (10YR 5/3) iron depletions and few medium distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly acid.

Range in Characteristics

Ap horizon:
Hue—10YR
Value—4
Chroma—3 or 4
Texture—loam

Bt horizon:
Hue—10YR or 7.5YR
Value—4 to 6
Chroma—4 to 6
Texture—clay loam, loam, sandy clay loam, or sandy loam; thin strata of loamy sand in some pedons

C horizon:
Hue—10YR
Value—4 to 6
Chroma—4 to 6
Texture—stratified loamy sand, loamy fine sand, sandy loam, loam, or silt loam; strata of very fine sand, fine sand, or coarse sand in some pedons

Milford Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderately slow
Landform: Interfluves, depressions, and drainageways on glacial lakes (relict)
Landform position: Summits on interfluves; toeslopes in depressions and drainageways
Parent material: Lacustrine sediments
Slope range: 0 to 2 percent
Taxonomic classification: Fine, mixed, mesic Typic Endoaquolls

Typical Pedon

Milford silty clay loam, 0 to 2 percent slopes, 1,850 feet east and 400 feet south of the northwest corner of sec. 29, T. 16 N., R. 13 W.

Ap1—0 to 9 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine and medium subangular blocky structure; firm; few very fine roots; slightly acid; clear smooth boundary.

Ap2—9 to 13 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine and medium angular blocky structure; firm; few very fine roots; neutral; clear wavy boundary.

Bg—13 to 21 inches; olive gray (5Y 5/2 and 4/2) silty clay; moderate fine and medium prismatic structure; firm; few very fine roots; few fine prominent olive (5Y 5/6) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual wavy boundary.

Btg1—21 to 29 inches; olive gray (5Y 5/2) silty clay; moderate medium prismatic structure; firm; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organo-clay films in root channels and few faint dark gray (5Y 4/1) pressure faces on faces of peds; common medium prominent light olive brown (2.5Y 5/6) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual wavy boundary.

Btg2—29 to 41 inches; gray (5Y 5/1) silty clay; moderate medium and coarse prismatic structure; firm; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organo-clay films in root channels and few distinct dark gray (5Y 4/1) pressure faces on faces of peds; many medium prominent light olive brown (2.5Y 5/6) and common medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual wavy boundary.

Btg3—41 to 47 inches; gray (5Y 5/1) silty clay loam; weak coarse prismatic structure; firm; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organo-clay films in root channels and few faint dark gray (5Y 4/1) pressure faces on faces of peds; many medium prominent light olive brown (2.5Y 5/6 and 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly alkaline; gradual wavy boundary.

Cg1—47 to 57 inches; gray (5Y 6/1) silt loam; massive with bands (1/8 to 1/4 inch thick) of horizontal stratification; firm; many medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; common fine and medium irregular white (10YR 8/1), weakly cemented nodules of calcium carbonate and few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; strongly effervescent; slightly alkaline; clear smooth boundary.

Cg2—57 to 60 inches; mixed light olive brown (2.5Y 5/4) and gray (N 6/0), stratified very fine sandy loam and silt loam; massive with bands (1/8 to 1/4 inch thick) of horizontal stratification; firm; many medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; strongly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 32 inches or more
Thickness of the mollic epipedon: 10 to 24 inches

Ap horizon:
Hue—10YR
Value—2 or 3
Chroma—1
Texture—silty clay loam

Bg or Btg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—silty clay or silty clay loam

Cg horizon:
Hue—2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 4
Texture—silty clay loam or silt loam or stratified silt loam, loam, very fine sandy loam, fine sandy loam, or sandy loam

Millbrook Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Interfluves on outwash plains
Landform position: Summits
Parent material: Loess and the underlying outwash
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Udollic Endoaqualfs

Typical Pedon

Millbrook silt loam, 0 to 2 percent slopes, 1,800 feet

east and 1,460 feet north of the southwest corner of sec. 26, T. 15 N., R. 14 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; few very fine roots; few fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly acid; abrupt smooth boundary.

E—9 to 14 inches; brown (10YR 5/3) silt loam; weak coarse subangular blocky structure parting to weak medium platy; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings in root channels; many medium faint light brownish gray (10YR 6/2) iron depletions and few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and few medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; moderately acid; abrupt smooth boundary.

Btg1—14 to 21 inches; light brownish gray (10YR 6/2) silty clay loam; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation and common medium faint light gray (10YR 7/1) iron depletions in the matrix; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; moderately acid; gradual wavy boundary.

Btg2—21 to 28 inches; light brownish gray (10YR 6/2) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; few faint dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) clay films on faces of peds; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation and common medium faint light gray (10YR 7/1) iron depletions in the matrix; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; moderately acid; clear wavy boundary.

2Btg3—28 to 41 inches; light brownish gray (10YR 6/2) clay loam; moderate medium and coarse prismatic structure; firm; few very fine roots; few faint grayish brown (10YR 5/2) clay films on faces of peds; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; common medium and coarse rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; moderately acid; gradual wavy boundary.

2BC—41 to 49 inches; yellowish brown (10YR 5/6), stratified sandy loam and loamy sand; weak coarse subangular blocky structure with bands (1/8 to 1/4 inch thick) of horizontal stratification; very friable; common medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; clear smooth boundary.

2Cg—49 to 60 inches; light brownish gray (2.5Y 6/2), stratified silt loam and loamy sand; massive; friable; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; few fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly alkaline.

Range in Characteristics

Depth to carbonates: 50 inches or more
Thickness of the loess: 28 to 40 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—2 or 3
Texture—silt loam

E horizon:
Hue—10YR
Value—4 to 6
Chroma—2 or 3
Texture—silt loam

Bt or Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—silty clay loam or silt loam

2Btg or 2BC horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—clay loam or sandy loam with thin strata of loamy sand

2Cg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 6
Texture—stratified sandy loam, loam, or clay loam with thin strata of loamy sand or sand

Oconee Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Slow
Landform: Interfluves on ground moraines
Landform position: Summits
Parent material: Loess
Slope range: 0 to 2 percent
Taxonomic classification: Fine, smectitic, mesic Udollic Epiaqualfs

Typical Pedon

Oconee silt loam, 0 to 2 percent slopes, 1,250 feet east and 2,560 feet south of the northwest corner of sec. 15, T. 12 N., R. 13 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure parting to moderate fine granular; friable; few very fine roots; few fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; moderately acid; abrupt smooth boundary.

E—9 to 12 inches; grayish brown (10YR 5/2) silt loam; moderate fine and medium subangular blocky structure; friable; common very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds and in pores; few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; strongly acid; abrupt smooth boundary.

Bt—12 to 22 inches; brown (10YR 5/3) silty clay loam; moderate medium and coarse prismatic structure parting to moderate medium and coarse subangular blocky; firm; few very fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; strongly acid; gradual smooth boundary.

Btg1—22 to 33 inches; light brownish gray (10YR 6/2) silty clay loam; moderate coarse prismatic structure parting to moderate medium and coarse subangular blocky; firm; few very fine roots; common distinct brown (10YR 5/3) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; moderately acid; gradual smooth boundary.

Btg2—33 to 47 inches; light brownish gray (10YR 6/2) silt loam; weak coarse prismatic structure parting to moderate coarse subangular blocky; firm; few very fine roots; common distinct brown (10YR 5/3) clay films on faces of peds and grayish brown (10YR 5/2) clay films in root channels and pores; common medium prominent strong brown (7.5YR 5/8) and many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly acid; gradual smooth boundary.

Btg3—47 to 56 inches; mottled yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) silt loam; weak coarse prismatic structure; friable; few very fine roots; few distinct grayish brown (10YR 5/2) clay films on faces of peds and in pores; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly acid; gradual smooth boundary.

Cg—56 to 60 inches; mottled yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) silt loam; massive; friable; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; about 15 percent fine sand; slightly acid.

Range in Characteristics

Thickness of the loess: 55 inches or more
Other features: Some pedons are underlain by till that contains a strongly developed paleosol between the depths of 55 and 60 inches.

Ap horizon:
Hue—10YR
Value—3
Chroma—2 or 3
Texture—silt loam

E horizon:
Hue—10YR
Value—5 or 6
Chroma—2
Texture—silt loam

Bt or Btg horizon:
Hue—10YR
Value—5 or 6

Chroma—1 to 6
Texture—silty clay loam or silty clay in the upper part; silt loam in the lower part

Pella Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landform: Interfluves, depressions, and drainageways on outwash plains and ground moraines
Landform position: Summits on interfluves; toeslopes in depressions and drainageways
Parent material: Loess and the underlying outwash
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Endoaquolls

Typical Pedon

Pella silty clay loam, 0 to 2 percent slopes, 2,375 feet west and 2,100 feet north of the southeast corner of sec. 35, T. 16 N., R. 13 W.

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few very fine roots; slightly acid; clear smooth boundary.

A—8 to 12 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; weak medium angular blocky structure (from compaction) in the upper part and moderate fine and medium subangular blocky structure in the lower part; firm; few very fine roots; many faint black (10YR 2/1) organic coatings on faces of peds and in pores; slightly acid; clear wavy boundary.

Btg1—12 to 18 inches; dark gray (10YR 4/1) silty clay loam; moderate fine and medium prismatic structure; firm; few very fine roots; common distinct very dark gray (10YR 3/1) organo-clay films on faces of peds; common medium prominent light olive brown (2.5Y 5/4) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual smooth boundary.

Btg2—18 to 24 inches; gray (5Y 5/1) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; few prominent very dark gray (10YR 3/1) organo-clay films on faces of peds; common medium faint dark grayish brown (2.5Y 4/2) and common medium faint dark gray (5Y 4/1) iron depletions and common medium prominent light olive brown (2.5Y 5/4) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual wavy boundary.

Btg3—24 to 36 inches; gray (5Y 5/1) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; few prominent black (10YR 2/1) organo-clay films on faces of peds; common medium prominent light olive brown (2.5Y 5/6) masses of iron accumulation and common medium faint dark grayish brown (2.5Y 4/2) iron depletions in the matrix; common medium and coarse rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly alkaline; clear smooth boundary.

2Btkg—36 to 43 inches; gray (5Y 6/1) silt loam; moderate medium and coarse prismatic structure; firm; few very fine roots between peds; few prominent black (10YR 2/1) organo-clay films and common faint gray (5Y 5/1) pressure faces on faces of peds; common medium prominent light olive brown (2.5Y 5/6) masses of iron accumulation and common medium faint gray (5Y 5/1) iron depletions in the matrix; common fine and medium irregular white (10YR 8/1), weakly cemented nodules of calcium carbonate throughout; few snail shells; about 18 percent fine sand; strongly effervescent; slightly alkaline; gradual smooth boundary.

2BCtkg—43 to 50 inches; gray (5Y 6/1) silt loam stratified with thin lenses of very fine sandy loam; moderate coarse subangular blocky structure; friable; few very fine roots between peds; few prominent black (10YR 2/1) organo-clay films and few faint gray (5Y 5/1) pressure faces on faces of peds; common medium prominent light olive brown (2.5Y 5/6) masses of iron accumulation in the matrix; few fine irregular white (10YR 8/1), weakly cemented nodules and moderately cemented concretions of calcium carbonate throughout; few snail shells; slightly effervescent; moderately alkaline; gradual wavy boundary.

2Cg—50 to 60 inches; gray (5Y 6/1) silt loam stratified with thin lenses of very fine sandy loam; massive; friable; common medium and coarse prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 16 to 40 inches
Thickness of the mollic epipedon: 10 to 24 inches
Thickness of the loess: 32 to 40 inches

Ap or A horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam

Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam

2Btkg or 2BCtkg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—1 or 2
Texture—silt loam, clay loam, or silty clay loam or stratified with these textures; thin lenses of very fine sandy loam in some pedons

2Cg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—5 or 6
Chroma—1 to 6
Texture—stratified silt loam, loam, silty clay loam, or sandy loam; thin lenses of fine sandy loam or very fine sandy loam in some pedons

Peotone Series

Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderately slow
Landform: Interfluves, depressions, and drainageways on outwash plains and ground moraines
Landform position: Summits on interfluves; toeslopes in depressions and drainageways
Parent material: Loess or silty colluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine, smectitic, mesic Cumulic Vertic Endoaquolls

Typical Pedon

Peotone silty clay loam, 0 to 2 percent slopes, 350 feet west and 1,800 feet south of the northeast corner of sec. 8, T. 13 N., R. 12 W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; firm; common fine roots; moderately acid; abrupt smooth boundary.
A—8 to 12 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine angular and subangular blocky structure; firm; common fine roots; slightly acid; abrupt smooth boundary.
Bg1—12 to 21 inches; black (N 2.5/0) silty clay, very dark gray (N 3/0) dry; strong medium angular and subangular blocky structure; very firm; few fine roots; neutral; clear smooth boundary.
Bg2—21 to 33 inches; black (N 2.5/0) silty clay, very dark gray (N 3/0) dry; weak medium prismatic structure parting to strong medium angular and subangular blocky; very firm; few fine roots; few fine prominent olive brown (2.5Y 4/4) masses of iron accumulation in the matrix; neutral; clear smooth boundary.
Btg1—33 to 42 inches; grayish brown (2.5Y 5/2) silty clay loam; weak medium prismatic structure parting to moderate medium and coarse subangular blocky; firm; few fine roots; common distinct black (10YR 2/1) organo-clay films on faces of peds; distinct black (10YR 2/1) krotovina; many fine and medium distinct and prominent light olive brown (2.5Y 5/4 and 5/6) masses of iron accumulation in the matrix; slightly effervescent; slightly alkaline; gradual smooth boundary.
Btg2—42 to 49 inches; olive gray (5Y 5/2) silty clay loam; weak coarse angular blocky structure; firm; few very fine roots; few distinct black (10YR 2/1) organo-clay films in root channels; common fine and medium distinct and prominent light olive brown (2.5Y 5/4 and 5/6) masses of iron accumulation in the matrix; slightly effervescent; slightly alkaline; gradual smooth boundary.
Cg—49 to 60 inches; olive gray (5Y 5/2) silt loam; massive; firm; common medium prominent light olive brown (2.5Y 5/6) and few medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; slightly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 30 inches or more
Thickness of the mollic epipedon: 24 to 36 inches

Ap or A horizon:
Hue—10YR or neutral
Value—2 or 3
Chroma—0 or 1
Texture—silty clay loam

Bg or Btg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—2 to 4 in the upper part; 4 to 6 in the lower part
Chroma—0 to 2
Texture—silty clay or silty clay loam

Cg horizon:
Hue—10YR, 2.5Y, 5Y, or neutral
Value—4 to 6
Chroma—0 to 2
Texture—silty clay loam or silt loam

Plano Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Interfluves on outwash plains
Landform position: Summits and backslopes
Parent material: Loess and the underlying outwash
Slope range: 2 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Argiudolls

Typical Pedon

Plano silt loam, 2 to 5 percent slopes, 1,240 feet east and 700 feet south of the northwest corner of sec. 18, T. 16 N., R. 11 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine and fine granular structure; friable; common very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

A—10 to 16 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine subangular blocky structure parting to moderate very fine granular; friable; common very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear wavy boundary.

BA—16 to 20 inches; brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; friable; few very fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; clear wavy boundary.

Bt1—20 to 27 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) organo-clay films and common faint brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual wavy boundary.

Bt2—27 to 38 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual wavy boundary.

Bt3—38 to 45 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

2Bt4—45 to 55 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct brown (7.5YR 4/4) clay films on faces of peds; about 8 percent fine gravel; slightly acid; clear wavy boundary.

2Bt5—55 to 60 inches; strong brown (7.5YR 5/6) sandy clay loam; weak coarse subangular blocky structure; friable; few very fine roots; common distinct brown (7.5YR 4/4) clay films on faces of peds; about 10 percent fine gravel; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 16 inches
Thickness of the loess: 40 to 55 inches

Ap or A horizon:
Hue—10YR
Value—3
Chroma—2 or 3
Texture—silt loam

BA or Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or silty clay loam

2Bt horizon:
Hue—10YR or 7.5YR
Value—3 to 5
Chroma—3 to 6
Texture—silt loam, loam, sandy loam, or clay loam or stratified with these textures

Proctor Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Interfluves on outwash plains
Landform position: Summits and backslopes
Parent material: Loess and the underlying outwash
Slope range: 0 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Argiudolls

Typical Pedon

Proctor silt loam, 2 to 5 percent slopes, 1,500 feet

west and 100 feet south of the northeast corner of sec. 32, T. 14 N., R. 13 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; friable; common very fine roots; neutral; clear smooth boundary.

A—9 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine and fine subangular blocky structure parting to moderate very fine granular; friable; common very fine roots; moderately acid; clear smooth boundary.

Bt1—13 to 17 inches; dark yellowish brown (10YR 4/4) silt loam; moderate very fine and fine subangular blocky structure; friable; common very fine roots; many distinct dark brown (10YR 3/3) organo-clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—17 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; firm; few very fine roots; many faint brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

2Bt3—25 to 33 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; firm; few very fine roots; common faint brown (10YR 4/3) clay films on faces of peds; about 1 percent fine gravel; moderately acid; clear smooth boundary.

2Bt4—33 to 45 inches; brown (7.5YR 4/4) sandy loam; moderate medium and coarse prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; few faint brown (10YR 4/3) clay films on faces of peds and few distinct very dark grayish brown (10YR 3/2) organo-clay films in root channels and pores; about 1 percent fine gravel; moderately acid; clear smooth boundary.

2BC—45 to 52 inches; brown (7.5YR 4/4) sandy loam stratified with thin lenses of loamy sand; moderate coarse subangular blocky structure; friable; few very fine roots; about 1 percent fine gravel; slightly acid; gradual smooth boundary.

2C—52 to 60 inches; mixed brown (7.5YR 4/4) and yellowish brown (10YR 5/4) sandy loam stratified with thin lenses of loamy sand; massive; very friable; about 2 percent fine gravel; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 15 inches
Thickness of the loess: 20 to 40 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—2 or 3
Texture—silt loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam or silt loam

2Bt or 2BC horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—clay loam or loam in the upper part and sandy loam, sandy clay loam, loam, or silt loam in the lower part; the 2BC horizon is commonly stratified with thin lenses of loamy sand

2C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—sandy loam, loam, or silt loam or stratified with these textures; thin lenses of loamy sand or sand in some pedons

Raub Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Parent material: Loess and the underlying till
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Aquic Argiudolls

Typical Pedon

Raub silt loam, 0 to 2 percent slopes, 2,500 feet east and 2,000 feet south of the northwest corner of sec. 5, T. 13 N., R. 12 W.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate very fine and fine granular structure; very friable; few medium and common fine roots; slightly acid; abrupt smooth boundary.

A—9 to 16 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; common medium roots; common distinct black (10YR 2/1)

organic coatings on faces of peds; slightly acid; abrupt smooth boundary.
Bt1—16 to 22 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; few medium roots; common faint dark grayish brown (10YR 4/2) clay films and common distinct black (10YR 2/1) organo-clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) and few fine faint brown (10YR 5/3) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.
Bt2—22 to 31 inches; brown (10YR 5/3) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; many distinct dark grayish brown (10YR 4/2) clay films and few distinct black (10YR 2/1) organo-clay films on faces of peds; common medium distinct and prominent yellowish brown (10YR 5/6 and 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; about 1 percent fine gravel; slightly acid; clear smooth boundary.
2Bt3—31 to 52 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; very dark gray (10YR 3/1) krotovina; common fine and medium prominent yellowish brown (10YR 5/6 and 5/8) masses of iron accumulation in the matrix; few fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; about 1 percent fine gravel; neutral; gradual smooth boundary.
2BC—52 to 60 inches; grayish brown (2.5Y 5/2) loam; weak coarse prismatic structure; firm; few very fine roots; many medium and coarse prominent yellowish brown (10YR 5/6 and 5/8) and common medium distinct light olive brown (2.5Y 5/4) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; about 1 percent fine gravel; slightly alkaline.

Range in Characteristics

Depth to carbonates: 40 inches or more
Thickness of the mollic epipedon: 10 to 17 inches
Thickness of the loess: 22 to 40 inches

Ap or A horizon:
Hue—10YR
Value—2 or 3
Chroma—1 or 2
Texture—silt loam

Bt horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam

2Bt or 2BC horizon:
Hue—10YR or 2.5Y
Value—4 or 5
Chroma—2 to 6
Texture—silty clay loam, clay loam, or loam

Russell Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Parent material: Loess and the underlying till
Slope range: 2 to 10 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

Russell silt loam, 2 to 5 percent slopes, 2,400 feet west and 1,150 feet south of the northeast corner of sec. 4, T. 12 N., R. 11 W.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; weak medium subangular blocky structure parting to moderate fine granular; friable; common very fine and fine roots; slightly alkaline; abrupt smooth boundary.
E1—6 to 9 inches; yellowish brown (10YR 5/4) silt loam; weak medium platy structure parting to weak fine subangular blocky; friable; few very fine roots; neutral; abrupt smooth boundary.
E2—9 to 13 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; friable; few very fine roots; common distinct very pale brown (10YR 7/3) silt coatings on faces of peds; moderately acid; clear smooth boundary.
Bt1—13 to 19 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm; few very fine roots; many faint dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—19 to 23 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate medium prismatic structure parting to strong fine angular blocky; firm; few very fine roots; many faint dark yellowish brown (10YR 4/4) clay films and common distinct light yellowish brown (10YR 6/4) clay depletions on faces of peds; strongly acid; abrupt smooth boundary.

Bt3—23 to 28 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate coarse prismatic structure; firm; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films and many faint light yellowish brown (10YR 6/4) clay depletions on faces of peds; slightly acid; gradual smooth boundary.

2Bt4—28 to 42 inches; dark yellowish brown (10YR 4/6) clay loam; moderate medium prismatic structure parting to weak coarse subangular blocky; firm; common prominent dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 5 percent fine gravel; neutral; gradual smooth boundary.

2Bt5—42 to 47 inches; dark yellowish brown (10YR 4/6) clay loam; weak medium prismatic structure; firm; few faint dark yellowish brown (10YR 4/4) clay films in root channels and pores; about 5 percent fine gravel; neutral; gradual smooth boundary.

2C—47 to 60 inches; yellowish brown (10YR 5/6) loam; massive; firm; about 10 percent fine gravel; strongly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 40 inches or more
Thickness of the loess: 20 to 40 inches

Ap horizon:
Hue—10YR
Value—4
Chroma—2 or 3
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture—silt loam

Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—4 to 6
Texture—silty clay loam or silt loam

2Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5
Chroma—4 to 6
Texture—clay loam or loam

2C horizon:
Hue—10YR
Value—5
Chroma—3 to 6
Texture—loam

Schuline Series

Depth class: Very deep and deep
Drainage class: Well drained
Permeability: Slow
Landform: Interfluves on ground moraines
Landform position: Summits and backslopes
Parent material: Reclaimed mine spoil
Slope range: 0 to 5 percent
Taxonomic classification: Fine-loamy, mixed, calcareous, mesic Typic Udorthents

Typical Pedon

Schuline silty clay loam, 0 to 2 percent slopes, 2,165 feet north and 1,635 feet east of the southwest corner of sec. 16, T. 14 N., R. 10 W.

Ap—0 to 9 inches; mixed, about 80 percent dark grayish brown (10YR 4/2), 10 percent gray (10YR 5/1), and 10 percent yellowish brown (10YR 5/6) silty clay loam, pale brown (10YR 6/3) dry; moderate very fine granular structure in the upper part and moderate fine angular blocky structure in the lower part; firm; few very fine roots; about 1 percent fine gravel; neutral; abrupt smooth boundary.

C1—9 to 16 inches; mixed, about 75 percent brown (10YR 5/3) and 20 percent yellowish brown (10YR 5/6) clay loam and 5 percent gray (10YR 5/1) silty clay loam; massive; firm; few very fine roots; about 1 percent fine gravel; strongly effervescent; slightly alkaline; clear smooth boundary.

C2—16 to 40 inches; mixed, about 75 percent brown (10YR 5/3), 20 percent yellowish brown (10YR 5/6), and 5 percent gray (10YR 6/1) clay loam and loam; massive; firm; few medium irregular light gray (10YR 7/2), weakly cemented nodules of calcium carbonate throughout; about 5 percent fine gravel; violently effervescent; slightly alkaline; abrupt smooth boundary.

C3—40 to 60 inches; mixed, about 50 percent light brownish gray (10YR 6/2) and 50 percent

yellowish brown (10YR 5/6) clay loam, silty clay loam, and silty clay; massive; very firm; few discontinuous prominent very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay films in pores; common fine and medium rounded and irregular black (7.5YR 2.5/1), weakly cemented nodules of iron and manganese oxide throughout; slightly effervescent; neutral.

Range in Characteristics

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—1 to 6
Texture—silty clay loam

C horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—1 to 6
Texture—dominantly clay loam or loam mixed with silty clay loam, silt loam, or silty clay

Senachwine Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Landform: End moraines and ground moraines
Landform position: Backslopes
Parent material: Till; or loess and the underlying till
Slope range: 5 to 60 percent
Taxonomic classification: Fine-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Senachwine silt loam, 10 to 18 percent slopes, eroded, 260 feet south and 1,450 feet west of the northeast corner of sec. 6, T. 12 N., R. 12 W.

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; mixed with yellowish brown (10YR 5/6) subsoil material; moderate fine granular structure in the upper part and moderate thin and medium platy structure in the lower part; friable; many very fine roots; slightly acid; abrupt smooth boundary.

Bt1—8 to 14 inches; yellowish brown (10YR 5/6) clay loam; moderate fine and medium subangular blocky structure; firm; many very fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 3 percent fine gravel; strongly acid; clear smooth boundary.

Bt2—14 to 24 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; firm; common very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films and common distinct pale brown (10YR 6/3) clay depletions on faces of peds; few fine prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 3 percent fine gravel; strongly acid; clear smooth boundary.

Bt3—24 to 37 inches; yellowish brown (10YR 5/4) clay loam; weak coarse subangular blocky structure; firm; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 5 percent fine gravel; slightly acid; gradual smooth boundary.

C—37 to 60 inches; yellowish brown (10YR 5/4) loam; massive; firm; few very fine roots; common medium prominent yellowish brown (10YR 5/8) iron accumulations and common medium distinct light brownish gray (10YR 6/2) iron depletions in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; iron depletions are relict redoximorphic features; about 5 percent fine gravel; strongly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 20 to 40 inches
Thickness of the loess: Less than 18 inches

Ap or A horizon:
Hue—10YR
Value—3 to 5
Chroma—1 to 4
Texture—loam, silt loam, or clay loam

E horizon (if it occurs):
Hue—10YR
Value—4 or 5
Chroma—3
Texture—loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—silty clay loam or clay loam in the upper part and clay loam or loam in the lower part

C horizon:
Hue—7.5YR or 10YR
Value—5 or 6
Chroma—3 or 4
Texture—loam or clay loam

Sexton Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Slow
Landform: Interfluves on outwash plains
Landform position: Summits
Parent material: Loess and the underlying outwash
Slope range: 0 to 2 percent
Taxonomic classification: Fine, smectitic, mesic Chromic Vertic Epiaqualfs

Typical Pedon

Sexton silt loam, 0 to 2 percent slopes, 150 feet north and 200 feet west of the southeast corner of sec. 18, T. 12 N., R. 13 W.

Ap—0 to 8 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; moderate very fine granular structure; friable; few very fine roots; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly alkaline; clear smooth boundary.

Eg—8 to 12 inches; gray (10YR 6/1) silt loam; moderate thin platy structure; friable; few very fine roots; few fine distinct brown (10YR 5/3) and common fine prominent yellowish brown (10YR 5/6) masses of iron accumulation and common fine faint dark grayish brown (10YR 4/2) iron depletions in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; abrupt smooth boundary.

Btg1—12 to 16 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common distinct dark grayish brown (10YR 4/2) and common faint grayish brown (10YR 5/2) clay films and common distinct light gray (10YR 7/1) clay depletions on faces of peds; common fine faint brown (10YR 4/3) and common fine distinct and prominent yellowish brown (10YR 5/4 and 5/6) masses of iron accumulation in the matrix; common medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; strongly acid; clear smooth boundary.

Btg2—16 to 29 inches; gray (10YR 5/1) silty clay; moderate fine and medium prismatic structure; firm; few very fine roots; common distinct dark grayish brown (10YR 4/2) and common faint grayish brown (10YR 5/2) clay films and common distinct light gray (10YR 7/1) clay depletions on faces of peds; common fine and medium distinct and prominent yellowish brown (10YR 5/4 and 5/6) masses of iron accumulation and common fine faint light brownish gray (10YR 6/2) iron depletions in the matrix; common fine and medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; strongly acid; gradual smooth boundary.

Btg3—29 to 36 inches; gray (10YR 5/1) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; common distinct grayish brown (2.5Y 5/2) clay films and few distinct light gray (10YR 7/1) clay depletions on faces of peds; common fine and medium distinct and prominent yellowish brown (10YR 5/4 and 5/6) masses of iron accumulation and common fine faint light brownish gray (10YR 6/2) iron depletions in the matrix; common fine and medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; strongly acid; clear smooth boundary.

2BCtg—36 to 45 inches; light brownish gray (10YR 6/2), stratified silty clay loam and clay loam; weak coarse prismatic structure; firm; common distinct grayish brown (2.5Y 5/2) clay films in root channels and pores; common fine and medium prominent yellowish brown (10YR 5/8) masses of iron accumulation and common fine faint gray (10YR 6/1) iron depletions in the matrix; common fine and medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; gradual smooth boundary.

2Cg—45 to 60 inches; mixed light brownish gray (10YR 6/2) and yellowish brown (10YR 5/4), stratified clay loam and sandy loam; massive; firm; few distinct grayish brown (2.5Y 5/2) clay films in root channels and pores; common fine and medium distinct yellowish brown (10YR 5/4 and 5/6) masses of iron accumulation and common fine faint gray (10YR 6/1) iron depletions in the matrix; common fine and medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid.

Range in Characteristics

Thickness of the loess: 35 to 55 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—1 or 2
Texture—silt loam

Eg horizon:
Hue—10YR
Value—5 or 6
Chroma—1 or 2
Texture—silt loam

Btg horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—1 or 2
Texture—silty clay or silty clay loam

2BCtg horizon:
Hue—10YR
Value—5 or 6
Chroma—1 or 2
Texture—silty clay loam, clay loam, loam, or sandy loam or stratified with these textures

2Cg horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—1 to 4
Texture—stratified silt loam, loam, sandy clay loam, sandy loam, or silty clay loam; thin lenses of sand or loamy sand in some pedons

Shoals Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Fine-loamy, mixed, nonacid, mesic Aeric Fluvaquents

Typical Pedon

Shoals silt loam, 0 to 2 percent slopes, frequently flooded, 600 feet north and 250 feet east of the southwest corner of sec. 10, T. 12 N., R. 11 W.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; moderate fine granular structure; friable; many very fine roots; neutral; clear smooth boundary.
Bw—8 to 17 inches; brown (10YR 4/3) silt loam; weak coarse subangular blocky structure parting to moderate thin and medium platy; friable; common very fine roots; many medium faint grayish brown (10YR 5/2) iron depletions in the matrix; common fine irregular and rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual wavy boundary.
Bg—17 to 37 inches; grayish brown (10YR 5/2) silt loam; weak coarse prismatic structure; friable; few very fine roots; few faint brown (10YR 4/3) coatings in root channels and pores; many fine prominent strong brown (7.5YR 4/6) and few fine faint brown (10YR 5/3) masses of iron accumulation in the matrix; few fine irregular and rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual wavy boundary.
Cg—37 to 60 inches; gray (10YR 6/1) loam; massive; friable; few very fine roots; common medium distinct brown (10YR 5/3) and few medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; common fine irregular and rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral.

Range in Characteristics

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam

Bw or Bg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—2 to 4
Texture—dominantly silt loam or loam; some pedons stratified with sandy loam, sandy clay loam, clay loam, or silty clay loam

Cg horizon:
Hue—10YR or 2.5Y
Value—5 or 6
Chroma—1 to 4
Texture—loam, silt loam, or sandy loam or stratified with these textures

St. Charles Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landform: Interfluves on outwash plains and stream terraces

Landform position: Summits and backslopes on outwash plains; treads and backslopes on stream terraces
Parent material: Loess and the underlying outwash
Slope range: 2 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Typic Hapludalfs

Typical Pedon

St. Charles silt loam, 2 to 5 percent slopes, 1,900 feet north and 2,375 feet west of the southeast corner of sec. 6, T. 12 N., R. 10 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak very fine granular structure; friable; common very fine roots; slightly alkaline; abrupt smooth boundary.
E—7 to 10 inches; brown (10YR 4/3) silt loam; weak thin platy structure; friable; few very fine roots; slightly alkaline; abrupt smooth boundary.
Bt1—10 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; firm; few very fine roots; few faint brown (10YR 4/3) clay films and few distinct light gray (10YR 7/1) clay depletions on faces of peds; neutral; clear smooth boundary.
Bt2—16 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common distinct brown (7.5YR 4/4) clay films and few distinct light gray (10YR 7/1) clay depletions on faces of peds; few fine irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; gradual smooth boundary.
Bt3—26 to 37 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium prismatic structure; firm; many distinct dark brown (7.5YR 3/4) clay films and few distinct light gray (10YR 7/1) clay depletions on faces of peds; few fine and medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; moderately acid; gradual smooth boundary.
Bt4—37 to 50 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure; firm; common distinct dark brown (7.5YR 3/4) clay films and few distinct light gray (10YR 7/1) clay depletions on faces of peds; common fine distinct strong brown (7.5YR 5/6) masses of iron accumulations and common fine faint brown (10YR 5/3) iron depletions in the matrix; common fine and medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; moderately acid; clear smooth boundary.
2Bt5—50 to 60 inches; yellowish brown (10YR 5/4) sandy clay loam; weak medium prismatic structure; firm; few distinct dark brown (7.5YR 3/4) clay films on faces of peds and in root channels and pores; common fine distinct strong brown (7.5YR 5/6) masses of iron accumulation and common fine faint brown (10YR 5/3) iron depletions in the matrix; common fine irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; moderately acid.

Range in Characteristics

Depth to carbonates: More than 50 inches
Thickness of the loess: 40 to 60 inches

Ap horizon:
Hue—10YR
Value—3 to 5
Chroma—3
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—3
Texture—silt loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 or 4
Texture—silty clay loam or silt loam

2Bt horizon:
Hue—7.5YR or 10YR
Value—5 or 6
Chroma—4 to 6
Texture—loam, sandy loam, fine sandy loam, sandy clay loam, clay loam, or silt loam that contains about 10 to 30 percent sand; or stratified with these textures

Starks Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Interfluves on outwash plains and stream terraces
Landform position: Summits on outwash plains; treads on stream terraces
Parent material: Loess and the underlying outwash

Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Aeric Endoaqualfs

Typical Pedon

Starks silt loam, 0 to 2 percent slopes, 1,075 feet east and 2,150 feet south of the northwest corner of sec. 10, T. 12 N., R. 12 W.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate very fine granular structure in the upper part and moderate thin and medium platy structure in the lower part; friable; common very fine and fine roots; slightly acid; abrupt smooth boundary.

E—9 to 13 inches; brown (10YR 5/3) silt loam; moderate medium platy structure; friable; few very fine roots; common fine faint light brownish gray (10YR 6/2) iron depletions and common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; abrupt smooth boundary.

Bt—13 to 21 inches; brown (10YR 5/3) silty clay loam; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; firm; few very fine roots; common faint dark yellowish brown (10YR 4/4) clay films and many faint light brownish gray (10YR 6/2) clay depletions on faces of peds; common medium faint light brownish gray (10YR 6/2) iron depletions in the matrix; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; very strongly acid; clear smooth boundary.

Btg1—21 to 30 inches; light brownish gray (10YR 6/2) silty clay loam; moderate medium and coarse prismatic structure; firm; few very fine roots; many distinct grayish brown (10YR 5/2) clay films and common faint light brownish gray (10YR 6/2) clay depletions on faces of peds; common medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; many fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; very strongly acid; clear smooth boundary.

2Btg2—30 to 35 inches; light brownish gray (10YR 6/2) sandy clay loam; moderate coarse prismatic structure; firm; few very fine roots; common distinct brown (10YR 5/3) clay films on faces of peds and few distinct brown (10YR 4/3) clay films in root channels and pores; common coarse distinct yellowish brown (10YR 5/4) and common coarse prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; moderately acid; clear smooth boundary.

2BC—35 to 40 inches; dark yellowish brown (10YR 4/6) sandy loam; weak coarse prismatic structure parting to weak coarse subangular blocky; friable; few medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; moderately acid; clear smooth boundary.

2C1—40 to 54 inches; dark yellowish brown (10YR 4/6), stratified sandy loam and sandy clay loam; massive; friable; few medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; abrupt smooth boundary.

2C2—54 to 60 inches; yellowish brown (10YR 5/4) loam; massive; friable; many medium distinct light brownish gray (10YR 6/2) iron depletions and common fine and medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral.

Range in Characteristics

Thickness of the loess: 24 to 40 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—1 to 3
Texture—silt loam

E horizon:
Hue—10YR
Value—5 or 6
Chroma—2 or 3
Texture—silt loam

Bt or Btg horizon:
Hue—2.5Y or 10YR
Value—4 to 6
Chroma—1 to 4
Texture—silty clay loam

2Btg or 2BC horizon:
Hue—2.5Y, 10YR, or 7.5YR
Value—4 to 6
Chroma—1 to 6
Texture—sandy loam, loam, silt loam, silty clay loam, sandy clay loam, or clay loam

2C horizon:
Hue—2.5Y, 10YR, or 7.5YR
Value—4 to 6
Chroma—1 to 6
Texture—stratified sandy loam, loam, silt loam, sandy clay loam, or clay loam; thin strata of sand in some pedons

Stonelick Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Taxonomic classification: Coarse-loamy, mixed, calcareous, mesic Typic Udifluvents

Typical Pedon

Stonelick fine sandy loam, 0 to 2 percent slopes, occasionally flooded, 2,550 feet east and 1,800 feet north of the southwest corner of sec. 6, T. 12 N., R. 10 W.

Ap—0 to 9 inches; dark brown (10YR 3/3) fine sandy loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; few very fine roots; very slightly effervescent; slightly alkaline; abrupt smooth boundary.
C1—9 to 16 inches; brown (10YR 4/3) fine sandy loam; weak fine and medium subangular blocky structure; friable; few very fine roots; very slightly effervescent; moderately alkaline; clear smooth boundary.
C2—16 to 23 inches; brown (10YR 4/3) fine sandy loam; weak medium subangular blocky structure; friable; few very fine roots; very slightly effervescent; moderately alkaline; gradual smooth boundary.
C3—23 to 31 inches; brown (10YR 4/3) loamy fine sand; massive; loose; few very fine roots; very slightly effervescent; moderately alkaline; clear smooth boundary.
C4—31 to 36 inches; brown (10YR 4/3) fine sandy loam; massive; friable; few very fine roots; very slightly effervescent; moderately alkaline; gradual smooth boundary.
C5—36 to 44 inches; brown (10YR 4/3) fine sandy loam; massive; very friable; few very fine roots; very slightly effervescent; moderately alkaline; gradual smooth boundary.
C6—44 to 60 inches; brown (10YR 4/3 and 5/3), stratified fine sandy loam and loamy fine sand; massive; very friable and loose; about 5 percent fine gravel below a depth of 55 inches; slightly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: Less than 10 inches

Ap horizon:
Hue—10YR
Value—3 to 5
Chroma—2 or 3
Texture—fine sandy loam

C horizon:
Hue—10YR
Value—4 or 5
Chroma—2 to 4
Texture—stratified fine sandy loam, sandy loam, loamy fine sand, sand, loam, or silt loam

Stoy Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Slow
Landform: Interfluves on ground moraines
Landform position: Summits and backslopes
Parent material: Loess
Slope range: 0 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Fragiaquic Hapludalfs

Typical Pedon

Stoy silt loam, 0 to 2 percent slopes, 750 feet west and 1,600 feet north of the southeast corner of sec. 18, T. 12 N., R. 12 W.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate very fine and fine granular structure; friable; common very fine roots; few fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly acid; abrupt smooth boundary.
E—9 to 14 inches; brown (10YR 5/3) silt loam; weak medium platy structure; friable; few very fine roots; few fine faint light brownish gray (10YR 6/2) iron depletions in the matrix; few fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly acid; abrupt smooth boundary.
Bt1—14 to 20 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; common distinct brown (10YR 5/3) clay films and few faint

light gray (10YR 7/2) clay depletions on faces of peds; strongly acid; clear smooth boundary.

Bt2—20 to 31 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; many distinct brown (10YR 5/3) clay films and many distinct light gray (10YR 7/2) clay depletions on faces of peds; common fine prominent light brownish gray (10YR 6/2) iron depletions in the matrix; common fine rounded black (10YR 2/1), moderately cemented concretions and weakly cemented nodules of iron and manganese oxide throughout; very strongly acid; gradual smooth boundary.

Btx1—31 to 49 inches; yellowish brown (10YR 5/6) silty clay loam; moderate coarse prismatic structure; very firm; common prominent grayish brown (10YR 5/2) and few faint brown (10YR 5/3) clay films on faces of peds; common fine prominent light gray (10YR 7/1) iron depletions and common medium distinct yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly brittle; strongly acid; gradual smooth boundary.

Btx2—49 to 60 inches; yellowish brown (10YR 5/6) silt loam; weak coarse prismatic structure; very firm; few distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine and medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; common fine and medium rounded black (10YR 2/1), moderately cemented concretions of iron and manganese oxide throughout; slightly brittle; moderately acid.

Range in Characteristics

Depth to fragipan characteristics: 30 to 45 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam

E horizon:
Hue—10YR
Value—5 or 6
Chroma—3 or 4
Texture—silt loam

Bt or Btx horizon:
Hue—10YR
Value—5 or 6
Chroma—2 to 8
Texture—commonly silty clay loam but may be silt loam in the lower part

Toronto Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Landform: Interfluves on end moraines and ground moraines
Landform position: Summits
Parent material: Loess and the underlying till
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Udollic Epiaqualfs

Typical Pedon

Toronto silt loam, 0 to 2 percent slopes, 2,050 feet east and 525 feet south of the northwest corner of sec. 25, T. 14 N., R. 12 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common very fine roots; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; abrupt smooth boundary.

E—9 to 12 inches; brown (10YR 5/3) silt loam; moderate thin and medium platy structure; friable; common very fine roots; common fine faint grayish brown (10YR 5/2) iron depletions and few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; strongly acid; abrupt smooth boundary.

Btg1—12 to 16 inches; grayish brown (10YR 5/2) silty clay loam; moderate medium subangular blocky structure parting to moderate fine angular blocky; firm; common very fine roots; many faint brown (10YR 5/3) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; strongly acid; clear smooth boundary.

Btg2—16 to 26 inches; light brownish gray (10YR 6/2) silty clay loam; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common very fine roots; many distinct brown (10YR 5/3) clay films and many faint light brownish gray (2.5Y 6/2) clay depletions on faces of peds; few distinct dark gray (10YR 4/1) clay

films in root channels and pores; common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; strongly acid; gradual wavy boundary.

2Btg3—26 to 33 inches; light brownish gray (10YR 6/2) clay loam; moderate coarse prismatic structure; firm; common very fine roots; few distinct dark gray (10YR 4/1) clay films on faces of peds and very dark grayish brown (10YR 3/2) organo-clay films in root channels and pores; many medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 1 percent fine gravel; slightly acid; gradual wavy boundary.

2Bt—33 to 44 inches; yellowish brown (10YR 5/4) clay loam; weak coarse prismatic structure; firm; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organo-clay films on faces of peds and in pores; few fine distinct light brownish gray (10YR 6/2) iron depletions and common fine and medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 1 percent fine gravel; neutral; gradual wavy boundary.

2BC—44 to 54 inches; yellowish brown (10YR 5/4) loam; weak coarse prismatic structure; firm; few distinct very dark grayish brown (10YR 3/2) organo-clay films in root channels and pores; common medium distinct light brownish gray (10YR 6/2) iron depletions and common fine and medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 10 percent fine gravel; neutral; clear wavy boundary.

2C—54 to 60 inches; yellowish brown (10YR 5/4) loam; massive; firm; few fine distinct light brownish gray (10YR 6/2) iron depletions and few fine prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 10 percent fine gravel; slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 40 inches or more

Thickness of the loess: 22 to 40 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silt loam

E horizon:
Hue—10YR
Value—4 or 5
Chroma—2 or 3
Texture—silt loam

Btg horizon:
Hue—10YR
Value—4 to 6
Chroma—1 to 4
Texture—silty clay loam

2Bt or 2BC horizon:
Hue—10YR
Value—4 to 6
Chroma—1 to 4
Texture—clay loam or loam

2C horizon:
Hue—10YR
Value—5 or 6
Chroma—3 or 4
Texture—loam

Virden Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderately slow
Landform: Interfluves and depressions on ground moraines
Landform position: Summits on interfluves; toeslopes in depressions
Parent material: Loess
Slope range: 0 to 2 percent
Taxonomic classification: Fine, smectitic, mesic Vertic Argiaquolls

Typical Pedon

Virden silt loam, 0 to 2 percent slopes, 1,450 feet west and 1,100 feet south of the northeast corner of sec. 14, T. 12 N., R. 13 W.

Ap1—0 to 6 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine and medium granular structure; friable; common very fine roots; slightly alkaline; abrupt smooth boundary.

Ap2—6 to 11 inches; very dark gray (10YR 3/1) silt

loam, gray (10YR 5/1) dry; weak fine and medium angular blocky structure; firm; common very fine roots; slightly alkaline; abrupt smooth boundary.

Btg1—11 to 16 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine and medium subangular blocky structure; friable; common very fine roots; many faint black (10YR 2/1) organo-clay films on faces of peds; common fine distinct yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; neutral; clear wavy boundary.

Btg2—16 to 22 inches; dark gray (10YR 4/1) silty clay; moderate fine and medium prismatic structure; firm; common very fine roots; many distinct very dark gray (10YR 3/1) organo-clay films on faces of peds; common medium distinct yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; neutral; gradual wavy boundary.

Btg3—22 to 28 inches; dark gray (10YR 4/1) silty clay; moderate medium prismatic structure; firm; common very fine roots; many distinct very dark gray (10YR 3/1) organo-clay films on faces of peds; many medium distinct yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; slightly acid; gradual wavy boundary.

Btg4—28 to 41 inches; gray (10YR 5/1) silty clay; moderate medium and coarse prismatic structure; firm; few very fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; many medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; moderately acid; diffuse wavy boundary.

Btg5—41 to 52 inches; gray (10YR 6/1) silty clay; moderate coarse prismatic structure; firm; few very fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; many coarse prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; slightly acid; diffuse wavy boundary.

Btg6—52 to 60 inches; gray (10YR 6/1) silty clay loam; weak coarse prismatic structure; friable; few very fine roots throughout; few faint dark gray (10YR 4/1) clay films on faces of peds and in root channels; many coarse prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 12 to 24 inches
Thickness of the loess: More than 60 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silt loam

Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—3 to 6
Chroma—1 or 2
Texture—silty clay loam or silty clay

Virgil Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Interfluves on outwash plains
Landform position: Summits
Parent material: Loess and the underlying outwash
Slope range: 0 to 2 percent
Taxonomic classification: Fine-silty, mixed, mesic Udollic Endoaqualfs

Typical Pedon

Virgil silt loam, 0 to 2 percent slopes, 100 feet south and 50 feet west of the northeast corner of sec. 1, T. 13 N., R. 11 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few very fine roots; neutral; abrupt smooth boundary.

Eg—7 to 10 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium platy structure; friable; few very fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings in root channels and pores; common fine distinct dark yellowish brown (10YR 4/4) masses of iron accumulation and common medium faint grayish brown (10YR 5/2) iron depletions in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; clear smooth boundary.

Btg1—10 to 17 inches; grayish brown (10YR 5/2) silty clay loam; moderate fine subangular blocky structure; firm; few very fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and common distinct very dark gray (10YR 3/1) organo-clay films in root channels and pores; common fine prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; clear smooth boundary.

Btg2—17 to 25 inches; brown (10YR 5/3) silty clay loam; moderate medium subangular blocky

structure; firm; few very fine roots; many distinct dark gray (10YR 4/1) and gray (10YR 5/1) clay films on faces of peds and few distinct very dark gray (10YR 3/1) organo-clay films in root channels and pores; common fine distinct yellowish brown (10YR 5/6) and common fine prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly acid; clear smooth boundary.

Btg3—25 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium subangular blocky structure; firm; few very fine roots; many distinct dark gray (10YR 4/1) and gray (10YR 5/1) clay films on faces of peds and few distinct very dark gray (10YR 3/1) organo-clay films in root channels and pores; many medium prominent yellowish brown (10YR 5/6) and many medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; common medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual smooth boundary.

Btg4—36 to 43 inches; grayish brown (2.5Y 5/2) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; many distinct dark gray (10YR 4/1) and gray (10YR 5/1) clay films on faces of peds and few distinct very dark gray (10YR 3/1) organo-clay films in root channels and pores; many medium prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; common medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual smooth boundary.

2Btg5—43 to 60 inches; grayish brown (2.5Y 5/2) clay loam; weak medium prismatic structure; friable; many distinct dark gray (10YR 4/1) clay films on faces of peds and few distinct very dark gray (10YR 3/1) organo-clay films in root channels and pores; many medium prominent strong brown (7.5YR 5/6 and 5/8) masses of iron accumulation in the matrix; few medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly alkaline.

Range in Characteristics

Depth to carbonates: 45 to 60 inches
Thickness of the loess: 40 to 50 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—1 or 2
Texture—silt loam

Eg horizon:
Hue—10YR
Value—4 or 5
Chroma—1 or 2
Texture—silt loam

Btg or Bt horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—2 to 4
Texture—silty clay loam

2Btg horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 or 5
Chroma—2 to 4
Texture—clay loam, loam, or sandy loam or stratified with these textures

Weir Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Very slow
Landform: Interfluves on ground moraines
Landform position: Summits
Parent material: Loess
Slope range: 0 to 2 percent
Taxonomic classification: Fine, smectitic, mesic Chromic Vertic Epiaqualfs

Typical Pedon

Weir silt loam, 0 to 2 percent slopes, 1,750 feet west and 650 feet north of the southeast corner of sec. 13, T. 12 N., R. 13 W.

Ap—0 to 8 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; weak fine granular structure; friable; common fine roots; slightly alkaline; abrupt smooth boundary.

Eg—8 to 18 inches; grayish brown (10YR 5/2) silt loam; weak thin and medium platy structure; friable; few very fine roots; common fine prominent yellowish brown (10YR 5/6) and common fine faint brown (10YR 5/3) masses of iron accumulation in the matrix; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; slightly alkaline; clear smooth boundary.

Btg1—18 to 29 inches; gray (10YR 6/1) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; many faint gray (10YR 5/1) clay films on faces of peds and common distinct dark gray (10YR 4/1) clay films in root channels and

pores; common fine prominent strong brown (7.5YR 4/6) and common fine distinct yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; strongly acid; gradual smooth boundary.

Btg2—29 to 46 inches; gray (10YR 6/1) silty clay loam; moderate coarse subangular blocky structure; firm; few very fine roots; many faint gray (10YR 5/1) clay films on faces of peds and common distinct dark gray (10YR 4/1) clay films in root channels and pores; common fine prominent strong brown (7.5YR 4/6) and few fine distinct yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; common fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; strongly acid; gradual smooth boundary.

Btg3—46 to 60 inches; gray (10YR 6/1) silty clay loam; weak coarse subangular blocky structure; firm; few faint gray (10YR 5/1) clay films on faces of peds and few distinct dark gray (10YR 4/1) clay films in root channels and pores; common fine prominent strong brown (7.5YR 4/6) and few fine distinct yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; strongly acid.

Range in Characteristics

Thickness of the loess: More than 60 inches

Ap horizon:
Hue—10YR
Value—4 or 5
Chroma—1 or 2
Texture—silt loam

Eg horizon:
Hue—10YR
Value—5 or 6
Chroma—2
Texture—silt loam

Btg horizon:
Hue—10YR or 2.5Y
Value—4 to 6
Chroma—1 or 2
Texture—typically silty clay loam but may be silty clay in the upper part and silt loam in the lower part

Wingate Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderately slow
Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Parent material: Loess and the underlying till
Slope range: 2 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Oxyaquic Hapludalfs

Typical Pedon

Wingate silt loam, 2 to 5 percent slopes, 985 feet north and 1,455 feet east of the southwest corner of sec. 25, T. 15 N., R. 12 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure parting to moderate fine granular; friable; many very fine roots; neutral; abrupt smooth boundary.

E—9 to 12 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium platy structure; friable; common very fine roots; neutral; abrupt smooth boundary.

Bt1—12 to 22 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; firm; few very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—22 to 27 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium angular blocky structure; firm; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

2Bt3—27 to 36 inches; yellowish brown (10YR 5/6) clay loam; moderate coarse subangular blocky structure; firm; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; few distinct black (10YR 2/1) stains of iron and manganese oxides on faces of peds; few fine prominent light brownish gray (10YR 6/2) iron depletions in the matrix; common fine and medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 2 percent fine gravel; moderately acid; clear smooth boundary.

2Bt4—36 to 52 inches; yellowish brown (10YR 5/4) clay loam; weak coarse subangular blocky structure; firm; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine

rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 5 percent fine gravel; neutral; gradual smooth boundary.

2C—52 to 60 inches; yellowish brown (10YR 5/4) loam; massive; firm; few fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 5 percent fine gravel; slightly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: More than 40 inches
Thickness of the loess: 24 to 40 inches

Ap horizon:
Hue—10YR
Value—3
Chroma—2 or 3
Texture—silt loam

E horizon:
Hue—10YR
Value—4
Chroma—3
Texture—silt loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silt loam or silty clay loam

2Bt horizon:
Hue—10YR
Value—5
Chroma—3 to 6
Texture—clay loam or loam

2C horizon:
Hue—10YR
Value—5
Chroma—3 or 4
Texture—loam

Wyanet Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Landform: End moraines and ground moraines
Landform position: Backslopes
Parent material: Till
Slope range: 2 to 10 percent
Taxonomic classification: Fine-loamy, mixed, mesic Typic Argiudolls
Taxadjunct feature: Wyanet silt loam, 5 to 10 percent slopes, eroded, has a thinner dark surface layer than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil. This soil is classified as fine-loamy, mixed, mesic Mollic Hapludalfs.

Typical Pedon

Wyanet silt loam, 5 to 10 percent slopes, eroded, 1,400 feet east and 1,000 feet south of the northwest corner of sec. 16, T. 14 N., R. 12 W.

Ap—0 to 6 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; mixed with about 10 percent dark yellowish brown (10YR 4/4) subsoil material; moderate fine subangular blocky structure parting to moderate fine granular; friable; many fine roots; about 3 percent fine gravel; slightly acid; abrupt smooth boundary.

Bt1—6 to 13 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; firm; common fine roots; common distinct brown (7.5YR 4/4) clay films on faces of peds; few fine prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; about 8 percent fine gravel; slightly acid; clear smooth boundary.

Bt2—13 to 21 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium subangular blocky structure parting to moderate fine subangular blocky; firm; few fine roots; common distinct brown (7.5YR 4/4) clay films on faces of peds; few fine prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; about 8 percent fine gravel; slightly acid; clear smooth boundary.

Bt3—21 to 32 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; few fine prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; about 6 percent fine gravel; neutral; gradual smooth boundary.

C—32 to 60 inches; yellowish brown (10YR 5/4) loam; massive; firm; few fine and medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide and few fine rounded white (10YR 8/1), weakly cemented nodules of calcium carbonate throughout; about 5 percent fine gravel; strongly effervescent; slightly alkaline.

Range in Characteristics

Depth to carbonates: 26 to 40 inches

Other features: Some pedons have a mantle of loess less than 18 inches thick.

Ap horizon:
Hue—10YR
Value—3
Chroma—2 or 3
Texture—silt loam

Bt or BC horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—loam, clay loam, or silty clay loam

C horizon:
Hue—10YR
Value—4 to 6
Chroma—3 or 4
Texture—loam

Xenia Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderately slow
Landform: Interfluves on end moraines and ground moraines
Landform position: Summits and backslopes
Parent material: Loess and the underlying till
Slope range: 2 to 5 percent
Taxonomic classification: Fine-silty, mixed, mesic Aquic Hapludalfs

Typical Pedon

Xenia silt loam, 2 to 5 percent slopes, 1,450 feet east and 150 feet south of the northwest corner of sec. 32, T. 13 N., R. 10 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

Bt1—7 to 18 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; firm; few very fine roots; common distinct brown (10YR 5/3) clay films on faces of peds and few distinct dark brown (10YR 3/3) organo-clay films in root channels and pores; common fine prominent yellowish brown (10YR 5/8) and few fine distinct strong brown (7.5YR 5/6) masses of iron accumulation and common fine distinct grayish brown (10YR 5/2) iron depletions in the matrix; common fine rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; gradual smooth boundary.

Bt2—18 to 34 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; common distinct brown (10YR 5/3) clay films on faces of peds and few distinct very dark grayish brown (10YR 3/2) organo-clay films in root channels and pores; many fine prominent yellowish brown (10YR 5/8) and few fine distinct strong brown (7.5YR 5/6) masses of iron accumulation and common fine distinct grayish brown (10YR 5/2) iron depletions in the matrix; common medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; neutral; clear smooth boundary.

2Bt3—34 to 46 inches; yellowish brown (10YR 5/4) clay loam; moderate coarse prismatic structure; firm; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds and common distinct very dark grayish brown (10YR 3/2) organo-clay films in root channels and pores; common fine distinct yellowish brown (10YR 5/6) and few fine distinct strong brown (7.5YR 5/6) masses of iron accumulation and few fine distinct grayish brown (10YR 5/2) iron depletions in the matrix; common medium rounded black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 3 percent fine gravel; neutral; clear smooth boundary.

2BCt—46 to 52 inches; yellowish brown (10YR 5/4) clay loam; weak coarse prismatic structure; firm; common distinct dark grayish brown (10YR 4/2) clay films on vertical faces of peds and in root channels and pores; common fine distinct yellowish brown (10YR 5/6) and few fine distinct strong brown (7.5YR 5/6) masses of iron accumulation and few fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; few medium irregular black (10YR 2/1), weakly cemented nodules of iron and manganese oxide throughout; about 5 percent fine gravel; slightly effervescent; slightly alkaline; clear smooth boundary.

2C—52 to 60 inches; yellowish brown (10YR 5/4) loam; massive; firm; few fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; few medium irregular black (10YR 2/1), weakly

cemented nodules of iron and manganese oxide throughout; about 7 percent fine gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

Depth to carbonates: 40 to 60 inches
Thickness of the loess: 22 to 40 inches

Ap horizon:
Hue—10YR
Value—4
Chroma—2 or 3
Texture—silt loam

Bt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—silty clay loam

2Bt or 2BCt horizon:
Hue—10YR
Value—4 or 5
Chroma—3 to 6
Texture—clay loam or loam

2C horizon:
Hue—10YR
Value—5
Chroma—3 or 4
Texture—loam

Formation of the Soils

Soils are natural bodies that have formed on the earth's surface. They contain living matter and are capable of supporting and providing nutrients to plants. Soils form through processes that act on deposited or accumulated geologic material. The characteristics of a soil are determined by the physical and mineralogical composition of the parent material; the climate under which the soil material has accumulated and existed since accumulation; the relief, or lay of the land; the plant and animal life on and in the soil; and the length of time that the processes of soil formation have acted on the parent material (Jenny, 1941).

The factors of soil formation are so closely related in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless conditions are specified for the other four. In Edgar County, differences in soil properties between adjacent soils are mainly the result of differences in relief. Changes in parent material and vegetation have also had significant influence on the soil properties in the county.

Parent Material

Parent material is the unconsolidated geologic material in which a soil forms. The physical and mineralogical composition of the soils affects the kind of soil profile that forms. The soils in Edgar County formed in a variety of parent materials, including till, loess, outwash, lacustrine sediments, alluvium, residuum derived from shale bedrock, and mine spoil.

Till is material laid down directly by glaciers with a minimum of water action. It typically has particles that vary in size, including sand, silt, clay, gravel, cobbles, and larger rock fragments. The smaller rock fragments in till generally have distinct edges and corners, indicating that they have not been subjected to intense washing by water. Unweathered till is generally calcareous and very dense.

Through the processes of soil formation, calcium carbonates are leached from the till and the material becomes more acidic and less dense.

Some of the soils in the county formed in till that was deposited during the Illinoian and Wisconsinan glaciations (Willman and others, 1975). The Illinois glacier covered all of the area that is now Edgar County between 300,000 and 125,000 years ago. Till was deposited over the entire county. Hickory soils formed in Illinoian till.

The more recent glaciation, the Wisconsinan, overrode most of the Illinoian till deposits, except in the extreme southern part of the county. The Shelbyville Moraine marks the farthest advance of the Wisconsinan glacier in Edgar County. Only the Woodfordian substage of the Wisconsinan glaciation entered the survey area. This substage occurred between 22,000 and 12,500 years ago. Senachwine soils formed in Wisconsinan till.

In some areas the upper part of the Illinoian till contains a strongly developed paleosol that formed during the Sangamon interglacial period. The Sangamon interglacial period occurred between the Illinoian and the Wisconsinan glaciations, 125,000 to 75,000 years ago, during a time when climatic conditions were favorable for soil-forming processes. This paleosol, known as the Sangamon paleosol, typically has a high content of clay and has been leached of calcium carbonates. Atlas soils formed in till that contains a strongly developed paleosol. Beneath the Sangamon paleosol is unweathered Illinoian till.

Loess is silty material that was deposited by the wind. The meltwaters from the glaciers, carrying vast quantities of silt, deposited these sediments in the major river valleys. As these sediments were exposed when the meltwaters subsided, the winds carried these silts and deposited them over much of the countryside. Loess is the most extensive parent material in Edgar County. Most of the soils in the county formed either entirely in loess or in loess and the underlying parent material. On ground moraines of Wisconsinan age, the thickness of the loess ranges from 20 to 60 inches but commonly is 36 to 48 inches. Flanagan soils are in these areas. They formed in 40 to 55 inches of loess and in the underlying till. On end moraines of Wisconsinan age, the loess is generally less than 40 inches thick. Raub soils are commonly in these areas. They formed in 22 to 40 inches of loess and in the underlying till. On ground moraines of Illinoian age, the loess is generally more than 60

inches thick. Stoy soils, which are in these areas, formed entirely in loess.

Outwash is material deposited by glacial meltwater from the Wisconsinan glacier. As the glacier melted, the ice produced great quantities of water. The meltwaters washed out material that had been held in the ice. The flowing water sorted the outwash material and deposited the sediments in layers, or strata, of different textures. The size of the particles that make up the outwash material varies, depending upon the velocity of the meltwater that carried the material. As the velocity of the meltwater slowed, the coarser material was deposited first. The depositing of particles of different sizes caused the layering or stratification in the outwash deposits. The outwash in Edgar County is generally sandy loam, loam, and silt loam and has thin layers of loamy sand and sand. A few areas have deposits of gravel within the layers of outwash. Martinsville soils formed in outwash. Elburn soils formed in a layer of loess and in the underlying outwash. In some places on Wisconsinan ground moraines, a thin layer of outwash occurs between the loess and the underlying till. Other areas of outwash are on stream terraces. Camden soils are on loess-covered stream terraces. In some areas of the county, the outwash has been a source of sand and gravel.

Lacustrine sediments consist of glacial material, ranging from fine clay to sand, that was deposited in glacial lakes, mainly by meltwaters. Between the Arcola Moraine and the West Ridge Moraine are deposits of lacustrine sediments in areas that were once covered by the eastern part of Glacial Lake Douglas. This lake was a large, shallow body of water that was temporarily trapped behind the Arcola Moraine when glacial deposits clogged many of the stream valleys as the glaciers receded (Gardiner and others, 1966). The lake eventually broke through the Arcola Moraine and drained at the present site of the Embarras River near Camargo in Douglas County. The deposits remaining after the lake drained have a high content of clay and are commonly stratified with loamy or sandy material. Milford soils formed in lacustrine sediments.

Alluvium is material recently deposited by floodwater from streams. Rains and water flowing over the land have eroded and removed some of the soil material from upland landforms. These sediments are carried in the runoff and enter streams and rivers. When the streams rise higher than the stream channel, the water spreads out over the flood plain and the velocity of the floodwater is reduced. The sediments are deposited as the water slows. Soils that formed in alluvium are generally stratified in color and texture. Stratification is caused by additions of material during separate flooding events. Variations in soil texture indicate differences in the speed of the floodwaters. Coarse particles of sand can settle out in rapidly moving water, but fine particles can settle out only in very slowly moving or stagnant water. The alluvial soils in Edgar County contain mostly silty and loamy sediments and may contain thin layers of sandy material. The largest area of alluvial soils is along Brouilletts Creek and its tributaries. Brouillett and Genesee soils formed in alluvium.

Shale, coal, and limestone underlie most of the unconsolidated deposits throughout the county (Willman and others, 1975). These bedrock formations were formed during the Pennsylvanian Period, when Illinois was covered by marine and freshwater seas. Subsequent glaciations altered the bedrock surface by eroding ridges and filling valleys and low areas with glacial deposits. The thickness of the overlying alluvial and glacial deposits ranges from 200 to 300 feet in ancient bedrock valleys to less than 1 foot on steep and very steep backslopes near Brouilletts Creek and its tributaries, where erosion has been intense (White and Parham, 1967). The shale is commonly soft and can be penetrated with a shovel. Soils that formed in material weathered from shale typically are silty clay or clay and extend only to a depth between 20 and 40 inches. Gosport soils formed in till and in the underlying residuum derived from shale bedrock.

Mine spoil is mixed and reworked material deposited by human activities in areas disturbed by surface-mining operations. It consists of all the material that had previously overlain the deposits of coal. It is a heterogeneous mixture of till, loess, shale, coal, limestone, and siltstone. Orthents formed in mine spoil.

Climate

Climate influences soil formation through its effect on weathering, plant and animal life, and erosion. Especially important are rainfall and temperature. As water from rains and melting snow seeps downward through the soils, it causes physical and chemical changes. Clay is moved down from the surface layer to the subsoil, where it accumulates. The water also dissolves minerals, which are then moved downward through the profile. This leaching has removed calcium carbonates from the upper layers in most of the soils in Edgar County. As a result, these layers are now more acidic.

Climate also influences the kind and extent of plant and animal life. The climate in Edgar County has

favored tall prairie grasses and deciduous hardwood forests. It has also favored the decomposition of plants and animals, which provides humus to the soil.

Heavy rains can be harmful if they fall on soils that are bare of vegetation. The raindrops disperse the soil particles, thereby contributing to erosion and the formation of crusts. Early spring rains can also cause extensive erosion when the soil is partially frozen. The freezing restricts the rate of water infiltration and thus increases the amount of runoff and erosion.

Edgar County has a temperate, humid, continental climate. The climate has been essentially uniform throughout the county and has not caused any obvious differences among the soils. The influence of climate becomes more obvious, however, when comparisons are made on a broad regional basis.

Relief

Relief includes such landform characteristics as position on the landform, slope gradient, slope shape, and slope aspect. Relief has strongly affected the soils in Edgar County through its influence on natural soil drainage, surface runoff, erosion, and deposition.

Variations in relief in the county reflect the variety of glacial landforms. The most extensive glacial landforms in the county are end moraines and ground moraines.

The Shelbyville Moraine marks the farthest advance of the Wisconsinan glacier. This end moraine has slopes that are quite variable, commonly ranging from gently sloping to very steep. It stands as much as 150 feet above the Illinoian ground moraine. The Shelbyville Moraine is actually a morainic system made up of three well defined end moraines, which mark three ice advances of the Woodfordian substage of the Wisconsinan glaciation (Willman and others, 1975). The individual moraines that make up the Shelbyville morainic system in Edgar County are the Paris Moraine, the Nevins Moraine, and the Westfield Moraine. The Shelbyville Moraine varies from 2 to 6 miles in width and forms an arc in Edgar County extending from Kansas to West Sandford, passing through Paris. Other end moraines also occur in the county. The Arcola Moraine, a broad, fragmented ridge 20 to 45 feet high and 1 to 2 miles wide, follows a sinuous path from approximately 1 mile north of Brocton to about 2 miles north of Paris, where it terminates. The West Ridge Moraine, the Hildreth Moraine, and the Ridge Farm Moraine combine to form a prominent ridge that is 50 to 75 feet high and 1 to 3 miles wide near the border of Vermilion County, Illinois. Dana, Senachwine, and Wyanet soils are examples of soils that occur on end moraines in the county.

Ground moraines of Wisconsinan age, which occur between the end moraines, generally consist of broad interfluves, depressions, and drainageways. The relief on ground moraines is less variable than the relief on end moraines, and the loess deposits are thicker. Slopes are generally nearly level to moderately sloping. Drummer and Flanagan soils are examples of soils that occur on Wisconsinan ground moraines.

Ground moraines of Illinoian age generally consist of interfluves that are commonly dissected by streams. The slopes are nearly level and gently sloping on the interfluves and are moderately sloping to very steep on backslopes near the streams. Hickory and Stoy soils are examples of soils that occur on Illinoian ground moraines.

Where the parent material is relatively uniform, differences in natural drainage are closely related to landform position, such as summit and backslope, and to slope gradient and shape. Drummer and Plano soils, for example, both formed in loess and the underlying outwash. Drummer soils are on summits and toeslopes. The slopes are nearly level and are commonly concave. Precipitation and runoff from the higher adjacent soils contribute to the ponding of surface water on the poorly drained Drummer soils. The water in the saturated soil pores restricts the circulation of air in the soil. Under these conditions, naturally occurring iron and manganese compounds are chemically reduced. The reduced form of iron and manganese is more soluble than the oxidized form and can be leached readily from the soil, leaving the subsoil with a grayish color. Plano soils, conversely, are well drained and are on gently sloping summits and backslopes that are convex. They are in higher landform positions than the Drummer soils. The seasonal high water table in the Plano soils is more than 6 feet below the surface. Because of the slope gradient and the convex slopes, the runoff rate is greater on Plano soils than on the Drummer soils. The soil pores in the Plano soils contain less water and more air. The iron and manganese compounds are well oxidized, resulting in a brownish subsoil.

Erosion and deposition are both processes related to relief. As slope gradient and slope length increase, the rate of surface runoff and the hazard of erosion also increase. The loss of surface soil material in one place results in deposition and accumulation in another place and thus affects the rate of soil formation and the development and thickness of soil horizons.

Plant and Animal Life

Soils are greatly affected by the type of vegetation under which they formed. Vegetation influences such soil properties as color, structure, reaction, and content and distribution of organic matter. Vegetation extracts water from the soil, recycles nutrients, and adds organic matter to the soil. Gases derived from root respiration combine with water to form acids that influence the weathering of minerals. Humus is very important in the development of soil structure and good tilth. Roots of plants not only contribute organic matter to the soil as they decay but also provide channels for the downward movement of water through the soil. The kind of organic matter in the soil depends primarily on the kind of native plants that grew on the soil during its formation.

At the time of early settlement, about 62 percent of the county supported prairie grasses and forbs (King, 1981). These prairie grasses had many fine, fibrous roots concentrated near the surface that added large amounts of organic matter to the soil as they died and decayed. Soils that formed under prairie vegetation have a thick surface layer that is commonly black or very dark gray in color. Dana, Drummer, and Flanagan soils formed under prairie vegetation.

About 32 percent of the county supported hardwood forests at the time of early settlement (King, 1981). The trees contributed organic matter to the soil mainly as leaf litter. The root systems of the trees were less fibrous than those of the prairie grasses and were generally not as densely concentrated near the surface. Consequently, the trees did not contribute as much organic matter to the surface layer as the prairie grasses. Soils that formed under trees have a thinner, lighter colored surface layer than the soils that formed under prairie grasses. Most of the forests were in areas near the major streams in the county. Fincastle, Russell, and Senachwine soils formed under woodland vegetation.

The native vegetation in the rest of the county was mixed prairie grasses and hardwood forests. Cowden, Oconee, Toronto, and Wingate soils formed under mixed vegetation. These soils have a surface layer that is similar to but darker than that of the soils that formed under predominantly woodland vegetation.

Bacteria, fungi, and other micro-organisms and earthworms, insects, and burrowing animals that live in or on the soil have also affected soil formation. The bacteria, fungi, and other micro-organisms help to break down and decompose dead plants and animals and turn them into humus. Earthworms, insects, and burrowing animals incorporate the humus into the soil and create small channels that influence soil aeration and the percolation of water.

Human activities, such as cultivation, construction, artificial drainage, the clearing of native forests, and surface mining, have significantly altered the nature of the existing plant and animal communities. These activities have also contributed to the loss of soil material and organic matter through accelerated erosion.

Time

Time is needed for the transformation of parent material into a soil that has differentiated horizons. In general, soil profiles become more strongly expressed over time. The effects of the other soil-forming factors, however, can modify the influence that time has on soil formation.

Shoals soils, for example, formed in recent alluvium. These soils have only weakly expressed horizons because the soil-forming processes are interrupted with each new deposition. Gosport soils formed in residuum from shale. They have weakly expressed horizons similar to those in the Shoals soils. The consolidated nature of the shale bedrock has slowed the process of soil formation, even though the parent material has been subjected to weathering for thousands of years.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The hillslope profile position that forms the steepest and generally linear, middle portion of the slope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depression. Any relatively sunken part of the earth's surface; especially a low-lying area surrounded by higher ground.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—***excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,*** and ***very poorly drained***. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. A term restricted to relatively small, linear depressions that, at some time, move concentrated water and either do not have a defined channel or have only a small defined channel.

Drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

End moraine. A ridgelike accumulation that was produced at the outer margin of a glacier.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called ***normal field capacity, normal moisture capacity,*** or ***capillary capacity***.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Footslope. The hillslope position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulder and backslope) and downslope sites of deposition (toeslope).

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial lake (relict). An area formerly occuped by a glacial lake.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground moraine. An extensive, fairly even layer of till having an uneven or undulating surface.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hillslope-profile position. Discrete slope segments found along a transect line that runs perpendicular to the contour, beginning at a divide and descending to a lower, bounding stream channel or valley floor. In descending order, the hillslope-profile positions of a simple hillslope include summit, shoulder, backslope, footslope, and toeslope. Not all of these components are necessarily present along a particular hillslope.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Lacustrine sediments. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Landform. Any physical, recognizable form or feature on the earth's surface, having a characteristic shape and range in composition and produced by natural causes.

Landscape. A collection of related, natural landforms; commonly the land surface that the eye can comprehend in a single view.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine. An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral,

and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—***few, common,*** and ***many;*** size—***fine, medium,*** and ***coarse;*** and contrast—***faint, distinct,*** and ***prominent***. The size measurements are of the diameter along the greatest dimension. ***Fine*** indicates less than 5 millimeters (about 0.2 inch); ***medium,*** from 5 to 15 millimeters (about 0.2 to 0.6 inch); and ***coarse,*** more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleosol. A soil that formed on a landscape in the past and has distinctive morphological features resulting from a soil-forming environment that no longer exists at the site.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, ***hardpan, fragipan, claypan, plowpan,*** and ***traffic pan***.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and

alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk

density, and the lowest water content at saturation of all organic soil material.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, the slope classes are as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 5 percent
Moderately sloping	5 to 10 percent
Moderately steep	10 to 18 percent
Steep	18 to 35 percent
Very steep	35 percent and higher

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C

horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream, and representing the dissected remnants of an abandoned flood plain, streambed, or valley floor produced during a former state of erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—***platy*** (laminated), ***prismatic*** (vertical axis of aggregates longer than horizontal), ***columnar*** (prisms with rounded tops), ***blocky*** (angular or subangular), and ***granular***. ***Structureless*** soils are either ***single grained*** (each grain by itself, as in dune sand) or ***massive*** (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. The topographically highest hillslope position of a hillslope profile. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (morphology). A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lakeshore, or seashore. The term is usually applied to both the relatively flat summit surface (tread), cut or built by stream or wave action, and the steeper descending slope (scarp, riser), graded to a lower base level of erosion.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are ***sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,*** and ***clay***. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till. Unsorted, nonstratified drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related

to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread. The flat or gently sloping surface of natural steplike landforms, commonly one of a series, such as successive stream terraces.

Upland. Land at a higher elevation than the flood plain or low stream terrace.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.—Temperature and Precipitation

(Recorded in the period 1961-90 at Paris Waterworks, Illinois)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	34.3	17.3	25.8	62	-14	2	2.16	0.79	3.29	5	9.3
February---	39.4	21.3	30.4	66	-9	4	2.15	1.10	3.06	5	7.4
March------	51.8	32.4	42.1	79	7	53	3.47	1.96	4.80	7	3.9
April------	64.7	42.8	53.7	85	23	183	3.92	2.17	5.47	7	.3
May--------	75.1	52.7	63.9	91	32	435	4.29	1.89	6.33	7	.0
June-------	84.0	61.8	72.9	96	45	688	3.76	1.92	5.36	6	.0
July-------	87.0	65.5	76.3	99	50	813	4.84	2.41	6.95	6	.0
August-----	84.6	63.2	73.9	96	48	740	3.84	1.87	5.55	5	.0
September--	78.9	56.6	67.8	94	37	534	3.11	1.26	4.66	5	.0
October----	66.7	45.0	55.9	87	25	228	2.60	1.30	3.73	5	.1
November---	52.6	34.9	43.7	76	12	55	3.35	1.59	4.86	6	1.3
December---	39.0	23.3	31.1	65	-8	8	3.59	1.77	5.17	6	6.3
Yearly:											
Average---	63.2	43.1	53.1	---	---	---	---	---	---	---	---
Extreme---	109	-23	---	100	-16	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,743	41.08	20.03	59.23	70	28.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.—Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Paris Waterworks, Illinois)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 9	Apr. 23	May 9
2 years in 10 later than--	Apr. 5	Apr. 18	May 3
5 years in 10 later than--	Mar. 28	Apr. 8	Apr. 22
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 28	Oct. 12	Oct. 3
2 years in 10 earlier than--	Nov. 1	Oct. 18	Oct. 9
5 years in 10 earlier than--	Nov. 10	Oct. 29	Oct. 19

Table 3.—Growing Season

(Recorded in the period 1961-90 at Paris Waterworks, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	208	180	158
8 years in 10	214	188	165
5 years in 10	226	203	179
2 years in 10	237	218	193
1 year in 10	243	226	200

Table 4.—Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
5C2	Blair silt loam, 5 to 10 percent slopes, eroded	1,325	0.3
7D2	Atlas silt loam, 10 to 18 percent slopes, eroded	760	0.2
8F	Hickory loam, 18 to 35 percent slopes	885	0.2
8G	Hickory loam, 35 to 60 percent slopes	970	0.2
50A	Virden silt loam, 0 to 2 percent slopes	360	*
56B	Dana silt loam, 2 to 5 percent slopes	16,720	4.2
56B2	Dana silt loam, 2 to 5 percent slopes, eroded	14,470	3.6
67A	Harpster silty clay loam, 0 to 2 percent slopes	145	*
69A	Milford silty clay loam, 0 to 2 percent slopes	1,585	0.4
104A	Virgil silt loam, 0 to 2 percent slopes	665	0.2
112A	Cowden silt loam, 0 to 2 percent slopes	675	0.2
113A	Oconee silt loam, 0 to 2 percent slopes	110	*
132A	Starks silt loam, 0 to 2 percent slopes	3,995	1.0
134A	Camden silt loam, 0 to 2 percent slopes	805	0.2
134B	Camden silt loam, 2 to 5 percent slopes	6,080	1.5
134C2	Camden silt loam, 5 to 10 percent slopes, eroded	1,510	0.4
148A	Proctor silt loam, 0 to 2 percent slopes	235	*
148B	Proctor silt loam, 2 to 5 percent slopes	2,740	0.7
149A	Brenton silt loam, 0 to 2 percent slopes	3,065	0.8
152A	Drummer silty clay loam, 0 to 2 percent slopes	129,165	32.4
153A	Pella silty clay loam, 0 to 2 percent slopes	2,435	0.6
154A	Flanagan silt loam, 0 to 2 percent slopes	49,810	12.5
164A	Stoy silt loam, 0 to 2 percent slopes	2,785	0.7
164B	Stoy silt loam, 2 to 5 percent slopes	1,980	0.5
165A	Weir silt loam, 0 to 2 percent slopes	5,040	1.3
171B	Catlin silt loam, 2 to 5 percent slopes	565	0.1
198A	Elburn silt loam, 0 to 2 percent slopes	7,885	2.0
199B	Plano silt loam, 2 to 5 percent slopes	325	*
208A	Sexton silt loam, 0 to 2 percent slopes	270	*
214B	Hosmer silt loam, 2 to 5 percent slopes	550	0.1
219A	Millbrook silt loam, 0 to 2 percent slopes	1,390	0.3
242A	Kendall silt loam, 0 to 2 percent slopes	1,640	0.4
243B	St. Charles silt loam, 2 to 5 percent slopes	370	*
291B	Xenia silt loam, 2 to 5 percent slopes	30,580	7.7
322B	Russell silt loam, 2 to 5 percent slopes	13,065	3.3
322C2	Russell silt loam, 5 to 10 percent slopes, eroded	3,055	0.8
330A	Peotone silty clay loam, 0 to 2 percent slopes	545	0.1
344B	Harvard silt loam, 2 to 5 percent slopes	2,055	0.5
348B	Wingate silt loam, 2 to 5 percent slopes	11,710	2.9
353A	Toronto silt loam, 0 to 2 percent slopes	5,850	1.5
481A	Raub silt loam, 0 to 2 percent slopes	13,665	3.4
496A	Fincastle silt loam, 0 to 2 percent slopes	9,830	2.5
551F	Gosport silt loam, 18 to 35 percent slopes	130	*
551G	Gosport loam, 35 to 50 percent slopes	590	0.1
570B2	Martinsville loam, 2 to 5 percent slopes, eroded	550	0.1
618C2	Senachwine silt loam, 5 to 10 percent slopes, eroded	11,245	2.8
618C3	Senachwine clay loam, 5 to 10 percent slopes, severely eroded	1,680	0.4
618D2	Senachwine silt loam, 10 to 18 percent slopes, eroded	3,505	0.9
618D3	Senachwine clay loam, 10 to 18 percent slopes, severely eroded	900	0.2
618F	Senachwine loam, 18 to 35 percent slopes	4,785	1.2
618G	Senachwine loam, 35 to 60 percent slopes	6,085	1.5
622B2	Wyanet silt loam, 2 to 5 percent slopes, eroded	1,465	0.4
622C2	Wyanet silt loam, 5 to 10 percent slopes, eroded	1,100	0.3
809F	Orthents, loamy-skeletal, acid, steep	85	*
813F	Orthents, silty, bedrock substratum-Pits, mine, complex, steep	140	*
823A	Schuline silty clay loam, 0 to 2 percent slopes	175	*
823B	Schuline silty clay loam, 2 to 5 percent slopes	75	*
3424A	Shoals silt loam, 0 to 2 percent slopes, frequently flooded	2,400	0.6
3450A	Brouillett silt loam, 0 to 2 percent slopes, frequently flooded	5,130	1.3
8431A	Genesee sandy loam, 0 to 2 percent slopes, occasionally flooded	2,315	0.6

See footnote at end of table.

Table 4.—Acreage and Proportionate Extent of the Soils—Continued

Map symbol	Soil name	Acres	Percent
8665A	Stonelick fine sandy loam, 0 to 2 percent slopes, occasionally flooded	4,185	1.0
	Water	705	0.2
	Total	398,910	100.0

* Less than 0.1 percent.

Table 5.—Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the map unit name)

Map symbol	Soil name
50A	Virden silt loam, 0 to 2 percent slopes (where drained)
56B	Dana silt loam, 2 to 5 percent slopes
56B2	Dana silt loam, 2 to 5 percent slopes, eroded
67A	Harpster silty clay loam, 0 to 2 percent slopes (where drained)
69A	Milford silty clay loam, 0 to 2 percent slopes (where drained)
104A	Virgil silt loam, 0 to 2 percent slopes (where drained)
112A	Cowden silt loam, 0 to 2 percent slopes (where drained)
113A	Oconee silt loam, 0 to 2 percent slopes (where drained)
132A	Starks silt loam, 0 to 2 percent slopes (where drained)
134A	Camden silt loam, 0 to 2 percent slopes
134B	Camden silt loam, 2 to 5 percent slopes
148A	Proctor silt loam, 0 to 2 percent slopes
148B	Proctor silt loam, 2 to 5 percent slopes
149A	Brenton silt loam, 0 to 2 percent slopes
152A	Drummer silty clay loam, 0 to 2 percent slopes (where drained)
153A	Pella silty clay loam, 0 to 2 percent slopes (where drained)
154A	Flanagan silt loam, 0 to 2 percent slopes
164A	Stoy silt loam, 0 to 2 percent slopes
164B	Stoy silt loam, 2 to 5 percent slopes
171B	Catlin silt loam, 2 to 5 percent slopes
198A	Elburn silt loam, 0 to 2 percent slopes
199B	Plano silt loam, 2 to 5 percent slopes
208A	Sexton silt loam, 0 to 2 percent slopes (where drained)
214B	Hosmer silt loam, 2 to 5 percent slopes
219A	Millbrook silt loam, 0 to 2 percent slopes (where drained)
242A	Kendall silt loam, 0 to 2 percent slopes (where drained)
243B	St. Charles silt loam, 2 to 5 percent slopes
291B	Xenia silt loam, 2 to 5 percent slopes
322B	Russell silt loam, 2 to 5 percent slopes
330A	Peotone silty clay loam, 0 to 2 percent slopes (where drained)
344B	Harvard silt loam, 2 to 5 percent slopes
348B	Wingate silt loam, 2 to 5 percent slopes
353A	Toronto silt loam, 0 to 2 percent slopes (where drained)
481A	Raub silt loam, 0 to 2 percent slopes
496A	Fincastle silt loam, 0 to 2 percent slopes (where drained)
570B2	Martinsville loam, 2 to 5 percent slopes, eroded
622B2	Wyanet silt loam, 2 to 5 percent slopes, eroded
823A	Schuline silty clay loam, 0 to 2 percent slopes
823B	Schuline silty clay loam, 2 to 5 percent slopes
3424A	Shoals silt loam, 0 to 2 percent slopes, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3450A	Brouillett silt loam, 0 to 2 percent slopes, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
8431A	Genesee sandy loam, 0 to 2 percent slopes, occasionally flooded
8665A	Stonelick fine sandy loam, 0 to 2 percent slopes, occasionally flooded

Table 6.—Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Grass-legume hay	Grass-legume
		Bu	Bu	Bu	Tons	AUM*
5C2--- Blair	3e	89	31	41	3.5	5.8
7D2--- Atlas	4e	48	15	18	2.0	3.4
8F--- Hickory	6e	---	---	---	2.2	3.6
8G--- Hickory	7e	---	---	---	---	---
50A--- Virden	2w	144	46	60	5.2	8.7
56B--- Dana	2e	142	45	59	5.4	9.1
56B2--- Dana	2e	137	43	58	5.3	8.8
67A--- Harpster	2w	136	44	52	5.0	8.3
69A--- Milford	2w	131	48	56	5.2	8.7
104A--- Virgil	1	148	45	60	5.6	9.3
112A--- Cowden	2w	120	37	53	4.8	8.0
113A--- Oconee	2w	120	36	54	5.0	8.3
132A--- Starks	2w	129	40	55	5.1	8.5
134A--- Camden	1	125	39	55	5.0	8.3
134B--- Camden	2e	124	39	54	5.0	8.2
134C2--- Camden	3e	117	37	52	4.7	7.8
148A--- Proctor	1	144	44	59	5.5	9.2
148B--- Proctor	2e	143	44	58	5.4	9.1
149A--- Brenton	1	160	47	62	5.9	9.8

See footnote at end of table.

Table 6.—Land Capability and Yields per Acre of Crops and Pasture—Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Grass-legume hay	Grass-legume
		Bu	Bu	Bu	Tons	AUM*
152A---------- Drummer	2w	154	51	61	5.5	9.2
153A---------- Pella	2w	140	48	56	5.2	8.7
154A---------- Flanagan	1	162	52	67	6.1	10.2
164A---------- Stoy	2w	112	35	52	4.5	7.5
164B---------- Stoy	2e	111	35	51	4.5	7.4
165A---------- Weir	3w	103	34	45	3.9	6.5
171B---------- Catlin	2e	149	46	60	5.7	9.6
198A---------- Elburn	1	161	50	63	6.1	10.2
199B---------- Plano	2e	149	45	59	5.7	9.6
208A---------- Sexton	2w	120	37	48	4.3	7.2
214B---------- Hosmer	2e	107	35	50	4.6	7.6
219A---------- Millbrook	1	144	43	59	5.4	9.0
242A---------- Kendall	2w	135	41	55	5.2	8.7
243B---------- St. Charles	2e	126	40	55	5.0	8.4
291B---------- Xenia	2e	125	41	54	4.8	7.9
322B---------- Russell	2e	124	41	54	4.8	7.9
322C2--------- Russell	3e	117	39	52	4.5	7.5
330A---------- Peotone	2w	123	42	43	4.2	7.0
344B---------- Harvard	2e	131	41	53	5.1	8.6
348B---------- Wingate	2e	132	42	55	5.0	8.4

See footnote at end of table.

Table 6.—Land Capability and Yields per Acre of Crops and Pasture—Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Grass-legume hay	Grass-legume
		Bu	Bu	Bu	Tons	AUM*
353A—Toronto	2w	141	44	59	5.4	9.0
481A—Raub	2w	155	51	63	6.1	10.2
496A—Fincastle	2w	131	41	55	5.0	8.3
551F—Gosport	7e	---	---	---	1.7	2.9
551G—Gosport	7e	---	---	---	---	---
570B2—Martinsville	2e	116	36	49	4.6	7.7
618C2—Senachwine	3e	114	38	48	4.5	7.5
618C3—Senachwine	4e	105	35	44	4.2	7.0
618D2—Senachwine	4e	108	36	45	4.3	7.1
618D3—Senachwine	6e	---	---	---	3.9	6.5
618F—Senachwine	6e	---	---	---	3.5	5.8
618G—Senachwine	7e	---	---	---	---	---
622B2—Wyanet	2e	124	42	55	5.1	8.5
622C2—Wyanet	3e	121	41	54	5.0	8.3
809F—Orthents	7s	---	---	---	---	---
813F: Orthents—Pits.	7s	---	---	---	---	---
823A—Schuline	2e	92	31	32	3.7	6.2
823B—Schuline	2e	87	29	30	3.7	6.0
3424A—Shoals	3w	131	41	55	4.5	7.5

See footnote at end of table.

Table 6.—Land Capability and Yields per Acre of Crops and Pasture—Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Winter wheat	Grass-legume hay	Grass-legume
		Bu	Bu	Bu	Tons	AUM*
3450A—Brouillett	3w	145	43	56	5.1	8.6
8431A—Genesee	2w	137	44	57	5.1	8.5
8665A—Stonelick	2w	94	28	40	3.9	6.5

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

Table 7.—Woodland Management and Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
5C2:										
Blair	4A	Slight	Slight	Moderate	Slight	Severe	Northern red oak	70	57	Eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							Bur oak	70	57	
							White oak	70	57	
							Green ash	---	---	
7D2:										
Atlas	4C	Slight	Slight	Moderate	Moderate	Severe	Northern red oak	70	57	Baldcypress, eastern redcedar, green ash, hickory, pin oak.
							White oak	70	57	
							Bur oak	70	57	
							Green ash	---	---	
8F:										
Hickory	5R	Moderate	Moderate	Slight	Slight	Severe	Northern red oak	85	72	Black walnut, eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							White oak	85	72	
							Green ash	---	---	
							Bitternut hickory	---	---	
							Black oak	---	---	
8G:										
Hickory	5R	Severe	Severe	Slight	Slight	Severe	Northern red oak	85	72	Black walnut, eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							White oak	85	72	
							Green ash	---	---	
							Bitternut hickory	---	---	
							Black oak	---	---	
132A:										
Starks	4A	Slight	Slight	Moderate	Moderate	Severe	Northern red oak	80	57	Eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							White oak	80	57	
							Black walnut	---	---	

See footnote at end of table.

Table 7.—Woodland Management and Productivity—Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
134A, 134B, 134C2:										
Camden	7A	Slight	Slight	Slight	Slight	Severe	Northern red oak	85	72	Black walnut, eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							White oak	85	72	
							Green ash	76	72	
164A, 164B:										
Stoy	4A	Slight	Slight	Moderate	Slight	Severe	Northern red oak	70	57	Eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							White oak	70	57	
							White ash	---	---	
							Bur oak	---	---	
165A:										
Weir	4W	Slight	Severe	Severe	Moderate	Severe	Pin oak	70	57	Baldcypress, bur oak, common hackberry, green ash, pin oak, swamp white oak.
							Black oak	---	---	
							White oak	---	---	
							Pignut hickory	---	---	
208A:										
Sexton	4W	Slight	Severe	Severe	Moderate	Severe	Pin oak	80	57	Baldcypress, bur oak, common hackberry, green ash, pin oak, swamp white oak.
							Tuliptree	---	---	
							White oak	---	---	
							Green ash	---	---	
214B:										
Hosmer	4A	Slight	Slight	Slight	Slight	Severe	White oak	68	57	Eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							Pin oak	87	72	
							Tuliptree	93	100	

See footnote at end of table.

Table 7.—Woodland Management and Productivity—Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
242A:										
Kendall	4A	Slight	Slight	Moderate	Moderate	Severe	Northern red oak	80	57	Eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							White oak	80	57	
							Black walnut	---	---	
							Tuliptree	90	86	
243B:										
St. Charles	7A	Slight	Slight	Slight	Slight	Severe	Northern red oak	85	72	Black walnut, eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							White oak	85	72	
							Tuliptree	95	100	
							Green ash	---	---	
291B:										
Xenia	5A	Slight	Slight	Slight	Slight	Severe	White oak	90	72	Black walnut, eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							Tuliptree	98	100	
322B, 322C2:										
Russell	5A	Slight	Slight	Slight	Slight	Severe	Northern red oak	90	72	Black walnut, eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							White oak	90	72	
							Tuliptree	96	100	
496A:										
Fincastle	4A	Slight	Slight	Moderate	Moderate	Severe	Northern red oak	75	57	Eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							Pin oak	85	72	
							White oak	75	57	
							Tuliptree	85	86	

See footnote at end of table.

Table 7.—Woodland Management and Productivity—Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
551F:										
Gosport	2R	Moderate	Moderate	Severe	Severe	Severe	White oak	45	29	Baldcypress, eastern redcedar, green ash, hickory, pin oak.
551G:										
Gosport	2R	Severe	Severe	Severe	Severe	Severe	White oak	45	29	Baldcypress, eastern redcedar, green ash, hickory, pin oak.
570B2:										
Martinsville	4A	Slight	Slight	Slight	Slight	Severe	White oak	80	57	Black walnut, eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							Tuliptree	98	100	
618C2, 618D2:										
Senachwine	5A	Slight	Slight	Slight	Slight	Severe	White oak	90	72	Black walnut, eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							Tuliptree	98	100	
618F:										
Senachwine	5R	Moderate	Moderate	Slight	Slight	Severe	White oak	90	72	Eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							Tuliptree	98	100	
618G:										
Senachwine	5R	Severe	Severe	Slight	Slight	Severe	White oak	90	72	Eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							Tuliptree	98	100	

See footnote at end of table.

Table 7.—Woodland Management and Productivity—Continued

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
3424A:										
Shoals	5W	Slight	Moderate	Moderate	Moderate	Severe	Pin oak	90	72	Eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							Tuliptree	90	86	
							Eastern cottonwood	---	---	
							White ash	---	---	
3450A:										
Brouillett	2W	Slight	Moderate	Moderate	Slight	Severe	Silver maple	70	29	Eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
							Red maple	---	---	
							White ash	---	---	
8431A:										
Genesee	8A	Slight	Slight	Slight	Slight	Severe	Tuliptree	100	114	Black walnut, eastern redcedar, eastern white pine, green ash, northern red oak, tuliptree, white oak.
8665A:										
Stonelick	4A	Slight	Slight	Slight	Slight	Moderate	Northern red oak	80	57	Eastern redcedar, eastern white pine, green ash, northern red oak, black walnut, tuliptree, white oak.
							Tuliptree	95	100	
							Black walnut	---	---	
							White ash	---	---	
							Sugar maple	---	---	
							Black cherry	---	---	
							White oak	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

Table 8.—Windbreaks and Environmental Plantings

(Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
5C2:					
Blair	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
7D2:					
Atlas	American plum, black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American hazelnut, Washington hawthorn, blackhaw, nannyberry, prairie crabapple, shadbush.	Baldcypress, eastern redcedar, green ash, northern whitecedar, tamarack.	Norway spruce, eastern white pine, pin oak.	---
8F, 8G:					
Hickory	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
50A:					
Virden	Black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	American witchhazel, common hackberry, eastern redcedar, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, pin oak.
56B, 56B2:					
Dana	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
67A:					
Harpster	Coralberry, mapleleaf viburnum, redosier dogwood.	Blackhaw, cockspur hawthorn, nannyberry, shadbush, silky dogwood.	Common hackberry, eastern redcedar, northern red oak, northern whitecedar, tamarack.	Baldcypress, green ash.	---

Table 8.—Windbreaks and Environmental Plantings—Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
69A: Milford	Black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	American witchhazel, common hackberry, eastern redcedar, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, pin oak.
104A: Virgil	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
112A: Cowden	Black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	American witchhazel, common hackberry, eastern redcedar, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, pin oak.
113A: Oconee	American plum, black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American hazelnut, Washington hawthorn, blackhaw, nannyberry, prairie crabapple, shadbush.	Baldcypress, eastern redcedar, green ash, northern whitecedar, tamarack.	Norway spruce, eastern white pine, pin oak.	Eastern cottonwood.
132A: Starks	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
134A, 134B, 134C2: Camden	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.

Table 8.—Windbreaks and Environmental Plantings—Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
148A, 148B: Proctor	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
149A: Brenton	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
152A: Drummer	Black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	American witchhazel, common hackberry, eastern redcedar, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, pin oak.
153A: Pella	Black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	American witchhazel, common hackberry, eastern redcedar, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, pin oak.
154A: Flanagan	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
164A, 164B: Stoy	American plum, black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American hazelnut, Washington hawthorn, blackhaw, nannyberry, prairie crabapple, shadbush.	Baldcypress, eastern redcedar, green ash, northern whitecedar, tamarack.	Norway spruce, eastern white pine, pin oak.	Eastern cottonwood.

Table 8.—Windbreaks and Environmental Plantings—Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
165A:					
Weir	Black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American plum, blackhaw, nannyberry, roughleaf dogwood, prairie crabapple.	American witchhazel, common hackberry, eastern redcedar, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, pin oak.
171B:					
Catlin	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
198A:					
Elburn	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
199B:					
Plano	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
208A:					
Sexton	Black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	American witchhazel, common hackberry, eastern redcedar, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, pin oak.
214B:					
Hosmer	American plum, black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American hazelnut, Washington hawthorn, blackhaw, nannyberry, prairie crabapple, shadbush.	Baldcypress, eastern redcedar, green ash, northern whitecedar, tamarack.	Norway spruce, eastern white pine, pin oak.	Eastern cottonwood.

Table 8.—Windbreaks and Environmental Plantings—Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
219A:					
Millbrook	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
242A:					
Kendall	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
243B:					
St. Charles	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
291B:					
Xenia	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
322B, 322C2:					
Russell	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
330A:					
Peotone	Black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American plum, blackhaw, nannyberry, prairie crabapple, roughleaf dogwood.	American witchhazel, common hackberry, eastern redcedar, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood, pin oak.

Table 8.—Windbreaks and Environmental Plantings—Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
344B:					
Harvard	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
348B:					
Wingate	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
353A:					
Toronto	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
481A:					
Raub	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
496A:					
Fincastle	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
551F, 551G:					
Gosport	American plum, black chokeberry, coralberry, gray dogwood, mapleleaf viburnum.	American hazelnut, Washington hawthorn, blackhaw, nannyberry, prairie crabapple, shadbush.	Baldcypress, eastern redcedar, green ash, northern whitecedar, tamarack.	Norway spruce, eastern white pine, pin oak.	Eastern cottonwood.

Table 8.—Windbreaks and Environmental Plantings—Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
570B2: Martinsville	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
618C2, 618C3, 618D2, 618D3, 618F, 618G: Senachwine	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
622B2, 622C2: Wyanet	Common winterberry, coralberry, gray dogwood, mapleleaf viburnum, redosier dogwood.	American hazelnut, American plum, blackhaw, prairie crabapple, roughleaf dogwood.	Eastern redcedar, nannyberry, northern whitecedar, shadbush, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
809F: Orthents	American plum, black chokeberry, blackhaw, gray dogwood, mapleleaf viburnum.	Cockspur hawthorn, eastern redcedar, eastern white pine, nannyberry, prairie crabapple, shadbush.	Black locust, honeylocust.	---	---
813F: Orthents	American plum, black chokeberry, blackhaw, gray dogwood, mapleleaf viburnum.	Cockspur hawthorn, eastern redcedar, eastern white pine, nannyberry, prairie crabapple, shadbush.	Black locust, honeylocust.	---	---
Pits.					
823A, 823B: Schuline	American hazelnut, coralberry, mapleleaf viburnum, redosier dogwood.	Downy arrowwood, eastern redcedar, shadbush, southern arrowwood.	Common hackberry, eastern white pine, green ash, northern red oak, tuliptree.	Eastern cottonwood	---

Table 8.—Windbreaks and Environmental Plantings—Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
3424A: Shoals	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
3450A: Brouillett	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
8431A: Genesee	Black chokeberry, common winterberry, coralberry, mapleleaf viburnum, silky dogwood.	American plum, prairie crabapple, rusty blackhaw, shadbush.	Washington hawthorn, eastern redcedar, nannyberry, northern red oak, northern whitecedar, tamarack.	Norway spruce, baldcypress, common hackberry, green ash, tuliptree.	Eastern cottonwood, eastern white pine, pin oak.
8665A: Stonelick	Coralberry, mapleleaf viburnum, redosier dogwood.	Blackhaw, downy arrowwood, shadbush, southern arrowwood.	Common hackberry, eastern redcedar, green ash, nannyberry, northern red oak, northern whitecedar.	---	---

Table 9.—Recreational Development

(See text for definitions of terms used in this table. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
5C2:					
Blair	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness.
7D2:					
Atlas	Severe: percs slowly, wetness.	Severe: percs slowly, wetness.	Severe: percs slowly, slope, wetness.	Severe: erodes easily, wetness.	Severe: wetness.
8F, 8G:					
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
50A:					
Virden	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
56B, 56B2:					
Dana	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
67A:					
Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
69A:					
Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
104A:					
Virgil	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
112A:					
Cowden	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
113A:					
Oconee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
132A:					
Starks	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
134A:					
Camden	Slight	Slight	Slight	Slight	Slight.
134B:					
Camden	Slight	Slight	Moderate: slope.	Slight	Slight.
134C2:					
Camden	Slight	Slight	Severe: slope.	Slight	Slight.

Table 9.—Recreational Development—Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
148A: Proctor	Slight	Slight	Slight	Slight	Slight.
148B: Proctor	Slight	Slight	Moderate: slope.	Slight	Slight.
149A: Brenton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
152A: Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
153A: Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
154A: Flanagan	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
164A, 164B: Stoy	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
165A: Weir	Severe: percs slowly, wetness.	Severe: percs slowly, wetness.	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.
171B: Catlin	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
198A: Elburn	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
199B: Plano	Slight	Slight	Moderate: slope.	Slight	Slight.
208A: Sexton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
214B: Hosmer	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, slope, wetness.	Moderate: wetness.	Moderate: wetness.
219A: Millbrook	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
242A: Kendall	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

Table 9.—Recreational Development—Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
243B:					
St. Charles	Slight	Slight	Moderate: slope.	Slight	Slight.
291B:					
Xenia	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: percs slowly, slope, wetness.	Moderate: wetness.	Moderate: wetness.
322B:					
Russell	Slight	Slight	Moderate: slope.	Slight	Slight.
322C2:					
Russell	Slight	Slight	Severe: slope.	Slight	Slight.
330A:					
Peotone	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
344B:					
Harvard	Slight	Slight	Moderate: slope.	Slight	Slight.
348B:					
Wingate	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
353A:					
Toronto	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
481A:					
Raub	Severe: wetness.	Moderate: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
496A:					
Fincastle	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
551F, 551G:					
Gosport	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: percs slowly, slope.	Severe: erodes easily, slope.	Severe: slope.
570B2:					
Martinsville	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
618C2:					
Senachwine	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.
618C3:					
Senachwine	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Severe: erodes easily.	Slight.

Table 9.—Recreational Development—Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
618D2, 618D3: Senachwine	Moderate: percs slowly, slope.	Moderate: percs slowly, slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
618F, 618G: Senachwine	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
622B2: Wyanet	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly, slope.	Slight	Slight.
622C2: Wyanet	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.
809F: Orthents	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
813F: Orthents	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Pits.					
823A: Schuline	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: small stones.	Slight	Slight.
823B: Schuline	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight	Slight.
3424A: Shoals	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.
3450A: Brouillett	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding.
8431A: Genesee	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
8665A: Stonelick	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.

Table 10.—Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that the soil was not rated)

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
5C2:										
Blair	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
7D2:										
Atlas	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8F, 8G:										
Hickory	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
50A:										
Virden	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
56B, 56B2:										
Dana	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
67A:										
Harpster	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair	Fair.
69A:										
Milford	Good	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
104A:										
Virgil	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
112A:										
Cowden	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
113A:										
Oconee	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
132A:										
Starks	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
134A, 134B:										
Camden	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
134C2:										
Camden	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
148A, 148B:										
Proctor	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
149A:										
Brenton	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
152A:										
Drummer	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
153A:										
Pella	Good	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
154A:										
Flanagan	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

Table 10.—Wildlife Habitat—Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
164A: Stoy	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
164B: Stoy	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
165A: Weir	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
171B: Catlin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
198A: Elburn	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
199B: Plano	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
208A: Sexton	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
214B: Hosmer	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
219A: Millbrook	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
242A: Kendall	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
243B: St. Charles	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
291B: Xenia	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
322B: Russell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
322C2: Russell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
330A: Peotone	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
344B: Harvard	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
348B: Wingate	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
353A: Toronto	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
481A: Raub	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

Table 10.—Wildlife Habitat—Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hard-wood trees	Conif-erous plants	Wetland plants	Shallow water areas	Open-land wild-life	Wood-land wild-life	Wetland wild-life
496A:										
Fincastle	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
551F, 551G:										
Gosport	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
570B2:										
Martinsville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
618C2, 618C3:										
Senachwine	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
618D2, 618D3:										
Senachwine	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
618F, 618G:										
Senachwine	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
622B2:										
Wyanet	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
622C2:										
Wyanet	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
809F:										
Orthents	Very poor.	Poor	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
813F:										
Orthents	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Pits.										
823A, 823B:										
Schuline	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3424A:										
Shoals	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
3450A:										
Brouillett	Good	Good	Fair	Good	Good	Fair	Fair	Good	Good	Fair.
8431A:										
Genesee	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
8665A:										
Stonelick	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

Table 11.—Building Site Development

(See text for definitions of terms used in this table. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
5C2:						
Blair	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
7D2:						
Atlas	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, slope, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.
8F, 8G:						
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
50A:						
Virden	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding.
56B, 56B2:						
Dana	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.
67A:						
Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, low strength, ponding.	Severe: ponding.
69A:						
Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, low strength, ponding.	Severe: ponding.
104A:						
Virgil	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.	Severe: wetness.
112A:						
Cowden	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.
113A:						
Oconee	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.

Table 11.—Building Site Development—Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
132A:						
Starks	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.	Severe: wetness.
134A, 134B:						
Camden	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
134C2:						
Camden	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
148A, 148B:						
Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
149A:						
Brenton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
152A:						
Drummer	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, low strength, ponding.	Severe: ponding.
153A:						
Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, low strength, ponding.	Severe: ponding.
154A:						
Flanagan	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell.	Severe: frost action, low strength, shrink-swell.	Moderate: wetness.
164A, 164B:						
Stoy	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
165A:						
Weir	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.
171B:						
Catlin	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Slight.

Table 11.—Building Site Development—Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
198A:						
Elburn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
199B:						
Plano	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
208A:						
Sexton	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.
214B:						
Hosmer	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Moderate: wetness.
219A:						
Millbrook	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.	Severe: wetness.
242A:						
Kendall	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.	Severe: wetness.
243B:						
St. Charles	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
291B:						
Xenia	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, low strength.	Moderate: wetness.
322B:						
Russell	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
322C2:						
Russell	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: frost action, low strength.	Slight.
330A:						
Peotone	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding.

Table 11.—Building Site Development—Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
344B:						
Harvard	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
348B:						
Wingate	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell.	Severe: frost action, low strength.	Moderate: wetness.
353A:						
Toronto	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.	Severe: wetness.
481A:						
Raub	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
496A:						
Fincastle	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength, wetness.	Severe: wetness.
551F, 551G:						
Gosport	Severe: slope, wetness.	Severe: shrink-swell, slope.	Severe: slope, wetness.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell, slope.	Severe: slope.
570B2:						
Martinsville	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.
618C2, 618C3:						
Senachwine	Moderate: dense layer.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
618D2, 618D3:						
Senachwine	Moderate: dense layer, slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
618F, 618G:						
Senachwine	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
622B2:						
Wyanet	Moderate: dense layer.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: low strength.	Slight.
622C2:						
Wyanet	Moderate: dense layer.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.

Table 11.—Building Site Development—Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
809F:						
Orthents	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
813F:						
Orthents	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
Pits.						
823A, 823B:						
Schuline	Moderate: dense layer, too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
3424A:						
Shoals	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, low strength, wetness.	Severe: flooding, wetness.
3450A:						
Brouillett	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
8431A:						
Genesee	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
8665A:						
Stonelick	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.

Table 12.—Sanitary Facilities

(See text for definitions of terms used in this table. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
5C2:					
Blair	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
7D2:					
Atlas	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
8F, 8G:					
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
50A:					
Virden	Severe: percs slowly, ponding.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: hard to pack, ponding, too clayey.
56B, 56B2:					
Dana	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: too clayey, wetness.	Moderate: wetness.	Fair: too clayey, wetness.
67A:					
Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
69A:					
Milford	Severe: percs slowly, ponding.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: hard to pack, ponding, too clayey.
104A:					
Virgil	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
112A:					
Cowden	Severe: percs slowly, wetness.	Slight	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
113A:					
Oconee	Severe: percs slowly, wetness.	Slight	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey, wetness.
132A:					
Starks	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

Table 12.—Sanitary Facilities—Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
134A:					
Camden	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey.
134B, 134C2:					
Camden	Moderate: percs slowly.	Severe: seepage, slope.	Severe: seepage.	Slight	Fair: too clayey.
148A, 148B:					
Proctor	Moderate: percs slowly.	Severe: seepage.	Severe: seepage, too sandy.	Slight	Fair: too clayey.
149A:					
Brenton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
152A:					
Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
153A:					
Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
154A:					
Flanagan	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey.
164A:					
Stoy	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
164B:					
Stoy	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
165A:					
Weir	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
171B:					
Catlin	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
198A:					
Elburn	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
199B:					
Plano	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey.

Table 12.—Sanitary Facilities—Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
208A:					
Sexton	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
214B:					
Hosmer	Severe: percs slowly, wetness.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
219A:					
Millbrook	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
242A:					
Kendall	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
243B:					
St. Charles	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
291B:					
Xenia	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
322B:					
Russell	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
322C2:					
Russell	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
330A:					
Peotone	Severe: percs slowly, ponding.	Slight	Severe: ponding, too clayey.	Severe: ponding.	Poor: hard to pack, ponding, too clayey.
344B:					
Harvard	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Fair: thin layer, too clayey.
348B:					
Wingate	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
353A:					
Toronto	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
481A:					
Raub	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.

Table 12.—Sanitary Facilities—Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
496A:					
Fincastle	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
551F, 551G:					
Gosport	Severe: depth to rock, percs slowly, wetness.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
570B2:					
Martinsville	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Fair: thin layer.
618C2, 618C3:					
Senachwine	Severe: percs slowly.	Severe: slope.	Slight	Slight	Good.
618D2, 618D3:					
Senachwine	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
618F, 618G:					
Senachwine	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
622B2:					
Wyanet	Severe: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
622C2:					
Wyanet	Severe: percs slowly.	Severe: slope.	Slight	Slight	Good.
809F:					
Orthents	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope, small stones.
813F:					
Orthents	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Pits.					
823A:					
Schuline	Severe: percs slowly.	Slight	Moderate: too clayey.	Slight	Fair: large stones, too clayey.
823B:					
Schuline	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight	Fair: large stones, too clayey.
3424A:					
Shoals	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

Table 12.—Sanitary Facilities—Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
3450A:					
Brouillett	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: small stones, wetness.
8431A:					
Genesee	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
8665A:					
Stonelick	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: seepage.

Table 13.—Construction Materials

(See text for definitions of terms used in this table. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
5C2:				
Blair	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
7D2:				
Atlas	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
8F, 8G:				
Hickory	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
50A:				
Virden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
56B, 56B2:				
Dana	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
67A:				
Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
69A:				
Milford	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
104A:				
Virgil	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
112A:				
Cowden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
113A:				
Oconee	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
132A:				
Starks	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
134A, 134B, 134C2:				
Camden	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

Table 13.—Construction Materials—Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
148A, 148B: Proctor	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
149A: Brenton	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
152A: Drummer	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
153A: Pella	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
154A: Flanagan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
164A, 164B: Stoy	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
165A: Weir	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
171B: Catlin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
198A: Elburn	Fair: wetness.	Probable	Improbable: too sandy.	Good.
199B: Plano	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
208A: Sexton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
214B: Hosmer	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
219A: Millbrook	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
242A: Kendall	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

Table 13.—Construction Materials—Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
243B: St. Charles	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
291B: Xenia	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
322B, 322C2: Russell	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
330A: Peotone	Poor: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
344B: Harvard	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
348B: Wingate	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
353A: Toronto	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
481A: Raub	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
496A: Fincastle	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
551F, 551G: Gosport	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
570B2: Martinsville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
618C2, 618C3: Senachwine	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
618D2, 618D3: Senachwine	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope, too clayey.

Table 13.—Construction Materials—Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
618F, 618G:				
Senachwine	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
622B2, 622C2:				
Wyanet	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
809F:				
Orthents	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope, small stones.
813F:				
Orthents	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Pits.				
823A, 823B:				
Schuline	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
3424A:				
Shoals	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3450A:				
Brouillett	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
8431A:				
Genesee	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
8665A:				
Stonelick	Good	Probable	Improbable: too sandy.	Fair: small stones.

Table 14.—Water Management

(See text for definitions of terms used in this table. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
5C2:						
Blair	Moderate: slope.	Severe: wetness.	Frost action, slope.	Erodes easily, slope, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
7D2:						
Atlas	Severe: slope.	Severe: hard to pack, wetness.	Frost action, percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, slope, wetness.	Erodes easily, slope, wetness.
8F, 8G:						
Hickory	Severe: slope.	Moderate: thin layer.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
50A:						
Virden	Slight	Severe: ponding.	Frost action, ponding.	Ponding	Erodes easily, ponding.	Erodes easily, wetness.
56B, 56B2:						
Dana	Moderate: seepage, slope.	Moderate: wetness.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
67A:						
Harpster	Moderate: seepage.	Severe: piping, ponding.	Frost action, ponding.	Ponding	Ponding	Wetness.
69A:						
Milford	Slight	Severe: ponding.	Frost action, ponding.	Ponding	Erodes easily, ponding.	Erodes easily, wetness.
104A:						
Virgil	Severe: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily, wetness.
112A:						
Cowden	Slight	Severe: wetness.	Frost action, percs slowly.	Percs slowly, wetness. erodes easily.	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.
113A:						
Oconee	Slight	Severe: hard to pack, wetness.	Frost action, percs slowly.	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.
132A:						
Starks	Moderate: seepage.	Severe: thin layer, wetness.	Frost action	Erodes easily, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
134A:						
Camden	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.

Table 14.—Water Management—Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
134B, 134C2:						
Camden	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
148A:						
Proctor	Severe: seepage.	Severe: piping.	Deep to water	Favorable	Erodes easily	Erodes easily.
148B:						
Proctor	Severe: seepage.	Severe: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
149A:						
Brenton	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Wetness	Wetness.
152A:						
Drummer	Moderate: seepage.	Severe: ponding.	Frost action, ponding.	Ponding	Ponding	Wetness.
153A:						
Pella	Moderate: seepage.	Severe: piping, ponding.	Frost action, ponding.	Ponding	Ponding	Wetness.
154A:						
Flanagan	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily, wetness.
164A:						
Stoy	Slight	Moderate: wetness.	Frost action, percs slowly.	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.
164B:						
Stoy	Moderate: slope.	Moderate: wetness.	Frost action, percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.
165A:						
Weir	Slight	Severe: wetness.	Frost action, percs slowly.	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.
171B:						
Catlin	Moderate: seepage, slope.	Moderate: wetness.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
198A:						
Elburn	Severe: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily, wetness.
199B:						
Plano	Severe: seepage.	Moderate: piping, thin layer.	Deep to water	Slope	Erodes easily	Erodes easily.
208A:						
Sexton	Slight	Severe: wetness.	Frost action, percs slowly.	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.	Erodes easily, percs slowly, wetness.

Table 14.—Water Management—Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
214B: Hosmer	Moderate: seepage, slope.	Moderate: piping, thin layer, wetness.	Frost action, percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, percs slowly, wetness.	Erodes easily, rooting depth.
219A: Millbrook	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily, wetness.
242A: Kendall	Moderate: seepage.	Severe: wetness.	Frost action	Erodes easily, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
243B: St. Charles	Moderate: seepage, slope.	Moderate: piping, thin layer.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
291B: Xenia	Moderate: seepage, slope.	Severe: wetness.	Frost action, slope.	Erodes easily, slope, wetness.	Erodes easily, wetness.	Erodes easily.
322B, 322C2: Russell	Moderate: seepage, slope.	Moderate: piping, thin layer.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
330A: Peotone	Slight	Severe: ponding.	Frost action, ponding.	Ponding	Ponding	Wetness.
344B: Harvard	Severe: seepage.	Moderate: piping, thin layer.	Deep to water	Slope	Erodes easily	Erodes easily.
348B: Wingate	Moderate: seepage, slope.	Severe: thin layer, wetness.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
353A: Toronto	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Wetness	Wetness.
481A: Raub	Slight	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily, wetness.
496A: Fincastle	Moderate: seepage.	Severe: wetness.	Frost action	Erodes easily, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
551F, 551G: Gosport	Severe: slope.	Slight	Depth to rock, percs slowly, slope.	Percs slowly, slope, wetness.	Depth to rock, erodes easily, slope.	Depth to rock, erodes easily, slope.

Table 14.—Water Management—Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
570B2:						
Martinsville	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.
618C2, 618C3:						
Senachwine	Moderate: seepage, slope.	Severe: piping.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily, rooting depth.
618D2, 618D3:						
Senachwine	Severe: slope.	Severe: piping.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, rooting depth, slope.
618F, 618G:						
Senachwine	Severe: slope.	Severe: piping.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, rooting depth, slope.
622B2, 622C2:						
Wyanet	Moderate: seepage, slope.	Severe: piping.	Deep to water	Rooting depth, slope.	Favorable	Rooting depth.
809F:						
Orthents	Severe: slope.	Severe: piping.	Deep to water	Droughty, rooting depth, slope.	Large stones, slope.	Droughty, large stones, slope.
813F:						
Orthents	Severe: slope.	Severe: piping.	Deep to water	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
Pits.						
823A:						
Schuline	Slight	Moderate: piping, thin layer.	Deep to water	Erodes easily, percs slowly.	Erodes easily	Erodes easily.
823B:						
Schuline	Moderate: slope.	Moderate: piping, thin layer.	Deep to water	Percs slowly, slope.	Erodes easily	Erodes easily.
3424A:						
Shoals	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Flooding, wetness.	Wetness	Wetness.
3450A:						
Brouillett	Severe: seepage.	Severe: piping, wetness.	Flooding	Flooding, wetness.	Wetness	Wetness.
8431A:						
Genesee	Moderate: seepage.	Severe: piping.	Deep to water	Flooding, soil blowing.	Erodes easily, soil blowing.	Erodes easily.

Table 14.—Water Management—Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
8665A: Stonelick	Severe: seepage.	Severe: piping, seepage.	Deep to water	Droughty, flooding, soil blowing.	Soil blowing, too sandy.	Droughty.

Table 15.—Engineering Index Properties

(Absence of an entry indicates that the data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
5C2:												
Blair	0-5	Silt loam	CL, CL-ML	A-4, A-6	0	0-2	95-100	90-100	90-100	85-95	20-35	5-15
	5-19	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0-5	95-100	90-100	90-100	70-100	30-50	15-30
	19-49	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0-5	95-100	90-100	85-100	70-95	30-50	15-30
	49-60	Silty clay loam, clay loam, silt loam.	CL	A-6	0	0-5	95-100	90-100	85-100	70-90	20-40	10-25
7D2:												
Atlas	0-5	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	75-95	25-35	5-15
	5-47	Silty clay loam, clay, clay loam.	CH	A-7	0	0	100	95-100	95-100	70-95	50-70	30-45
	47-60	Clay loam	CL	A-6, A-7	0	0	95-100	90-98	90-98	65-95	35-55	20-30
8F:												
Hickory	0-8	Loam	CL, CL-ML, ML	A-4, A-6	0	0-5	95-100	90-100	75-100	55-100	20-35	3-15
	8-48	Clay loam, silty clay loam, loam.	CL	A-6, A-7	0-1	0-5	85-100	70-100	65-95	50-85	30-50	15-30
	48-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-1	0-5	85-100	70-95	45-95	25-75	20-40	5-20
8G:												
Hickory	0-8	Loam	CL, CL-ML, ML	A-4, A-6	0	0-5	95-100	90-100	75-100	55-100	20-35	3-15
	8-48	Clay loam, silty clay loam, loam.	CL	A-6, A-7	0-1	0-5	85-100	70-100	65-95	50-85	30-50	15-30
	48-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-1	0-5	85-100	70-95	45-95	25-75	20-40	5-20
50A:												
Virden	0-11	Silt loam	CL	A-6, A-7	0	0	100	100	95-100	95-100	30-45	10-20
	11-60	Silty clay, silty clay loam.	CH, CL	A-7-6	0	0	100	100	95-100	95-100	40-60	20-40

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
56B:												
Dana	0-12	Silt loam	CL	A-4, A-6	0	0	100	100	95-100	85-95	30-35	8-12
	12-29	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-98	38-50	20-32
	29-46	Clay loam	CL	A-6, A-7	0	0-3	90-98	90-95	80-90	55-75	32-50	17-30
	46-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-3	0-3	85-95	80-90	75-85	50-70	17-30	7-14
56B2:												
Dana	0-12	Silt loam	CL	A-4, A-6	0	0	100	100	95-100	85-95	30-35	8-12
	12-29	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-98	38-50	20-32
	29-46	Clay loam	CL	A-6, A-7	0	0-3	90-98	90-95	80-90	55-75	32-50	17-30
	46-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-3	0-3	85-95	80-90	75-85	50-70	17-30	7-14
67A:												
Harpster	0-12	Silty clay loam	CH, CL	A-7	0	0	100	95-100	95-100	90-100	45-60	20-35
	12-35	Silty clay loam	CH, CL	A-7	0	0	100	95-100	95-100	85-100	40-60	20-35
	35-41	Silty clay loam, silt loam, loam.	CH, CL	A-6, A-7	0	0	100	95-100	95-100	60-100	35-55	20-35
	41-60	Stratified sandy loam to clay loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	0	100	95-100	95-100	40-80	20-50	5-25
69A:												
Milford	0-13	Silty clay loam	CH, CL	A-7	0	0	100	95-100	90-100	75-95	40-55	20-30
	13-47	Silty clay, silty clay loam.	CH, CL	A-7	0	0	100	95-100	90-100	75-100	40-60	20-40
	47-60	Stratified sandy loam to silty clay loam.	CL, SC	A-6, A-7	0	0	95-100	95-100	90-100	40-100	25-50	10-30
104A:												
Virgil	0-7	Silt loam	CL	A-4, A-6	0	0	100	100	90-100	85-95	20-35	8-20
	7-10	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-95	20-35	5-20
	10-43	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	15-30
	43-60	Loam, sandy loam, clay loam.	CL, CL-ML, SC, SC-SM	A-2-4, A-4, A-6	0	0-5	90-100	85-100	70-100	30-80	20-35	5-15

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
112A:												
Cowden----------	0-8	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	3-15
	8-17	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-35	5-15
	17-46	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	95-100	95-100	45-60	20-32
	46-60	Silt loam------	CL	A-6, A-7-6	0	0	100	100	95-100	95-100	30-45	10-20
113A:												
Oconee----------	0-9	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	20-40	3-20
	9-12	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	90-100	20-35	8-20
	12-33	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-65	20-45
	33-56	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	10-25
	56-60	Silt loam------	CL	A-4, A-6, A-7-6	0	0	100	100	90-100	85-100	20-45	8-25
132A:												
Starks----------	0-13	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-100	20-35	4-15
	13-30	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-100	35-45	15-25
	30-40	Loam, silty clay loam, sandy loam.	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0	95-100	90-100	80-95	40-85	25-40	6-17
	40-60	Stratified sandy loam to sandy clay loam.	CL, ML, SC, SM	A-2, A-4, A-6	0-1	0-5	90-100	80-95	40-90	20-80	0-30	NP-15
134A:												
Camden----------	0-10	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	10-33	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	33-41	Clay loam, sandy loam, silt loam.	CL, ML, SC, SM	A-2, A-4, A-6	0	0-5	90-100	85-100	60-100	30-70	20-40	3-15
	41-60	Stratified sandy loam to silt loam.	CL, ML, SC, SM	A-2, A-4	0	0-5	90-100	80-100	50-80	20-70	15-25	3-10

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
134B:												
Camden----------	0-10	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	10-33	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	33-41	Clay loam, sandy loam, silt loam.	CL, ML, SC, SM	A-2, A-4, A-6	0	0-5	90-100	85-100	60-100	30-70	20-40	3-15
	41-60	Stratified sandy loam to silt loam.	CL, ML, SC, SM	A-2, A-4	0	0-5	90-100	80-100	50-80	20-70	15-25	3-10
134C2:												
Camden----------	0-8	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	3-15
	8-29	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	15-25
	29-48	Clay loam, sandy loam, silt loam.	CL, ML, SC, SM	A-2, A-4, A-6	0	0-5	90-100	85-100	60-100	30-70	20-40	3-15
	48-60	Stratified sandy loam to silt loam.	CL, ML, SC, SM	A-2, A-4	0	0-5	90-100	80-100	50-80	20-70	15-25	3-10
148A:												
Proctor---------	0-13	Silt loam------	CL	A-6	0	0	100	100	95-100	85-100	25-40	10-20
	13-25	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	95-100	90-100	85-100	85-100	25-50	10-25
	25-45	Clay loam, sandy loam, loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6, A-7	0	0	85-100	85-100	75-100	30-80	20-45	5-25
	45-60	Stratified loam to sand.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0	0	85-100	80-100	50-100	20-80	20-40	5-20
148B:												
Proctor---------	0-13	Silt loam------	CL	A-6	0	0	100	100	95-100	85-100	25-40	10-20
	13-25	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	95-100	90-100	85-100	85-100	25-50	10-25
	25-45	Clay loam, sandy loam, loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6, A-7	0	0	85-100	85-100	75-100	30-80	20-45	5-25
	45-60	Stratified loam to sand.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0	0	85-100	80-100	50-100	20-80	20-40	5-20

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
149A:												
Brenton	0-13	Silt loam	CL	A-4, A-6	0	0	100	100	95-100	85-100	30-40	8-15
	13-30	Silty clay loam, silt loam.	CL, ML	A-6, A-7	0	0	100	100	95-100	85-100	35-50	10-25
	30-45	Clay loam, loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	90-100	55-80	30-45	10-20
	45-60	Stratified sandy loam to silt loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0	0	95-100	85-100	75-100	15-85	20-35	5-20
152A:												
Drummer	0-13	Silty clay loam	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	30-50	15-30
	13-46	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	95-100	85-95	30-50	15-30
	46-56	Silt loam, clay loam, sandy loam.	CL, SC	A-6, A-7	0	0-5	95-100	90-100	75-95	40-85	30-50	15-30
	56-60	Stratified silty clay loam to sandy loam.	CL, SC	A-2-4, A-4, A-6	0	0-5	95-100	75-95	75-95	15-80	20-35	7-20
153A:												
Pella	0-12	Silty clay loam	CL	A-7	0	0	100	95-100	90-100	85-95	40-50	15-25
	12-36	Silty clay loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	30-50	15-30
	36-43	Stratified silty clay loam to sandy loam.	CL	A-6, A-7	0-1	0-5	95-100	90-100	85-95	40-90	25-45	10-25
	43-60	Stratified sandy loam to silty clay loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0-1	0-5	90-100	80-100	50-100	30-85	20-35	7-20

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
154A:												
Flanagan--------	0-18	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	15-30
	18-53	Silty clay loam, silty clay.	CH, CL	A-7	0	0	100	100	95-100	90-100	40-60	15-30
	53-60	Loam, clay loam, silt loam.	CL, CL-ML	A-4, A-6, A-7	0	0	90-100	90-100	85-95	55-80	20-45	5-30
164A:												
Stoy------------	0-14	Silt loam------	CL, ML	A-6	0	0	100	100	95-100	90-100	30-40	10-15
	14-31	Silty clay loam	CL	A-7	0	0	100	100	95-100	90-100	40-50	22-32
	31-49	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	15-25
	49-60	Silt loam------	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	13-25
164B:												
Stoy------------	0-14	Silt loam------	CL, ML	A-6	0	0	100	100	95-100	90-100	30-40	10-15
	14-31	Silty clay loam	CL	A-7	0	0	100	100	95-100	90-100	40-50	22-32
	31-49	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	15-25
	49-60	Silt loam------	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	13-25
165A:												
Weir------------	0-8	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	5-17
	8-18	Silt loam------	CL, CL-ML, ML	A-4	0	0	100	100	95-100	90-100	0-25	3-10
	18-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	15-30
171B:												
Catlin----------	0-17	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	85-100	25-40	8-20
	17-46	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	90-100	90-100	80-100	30-50	15-30
	46-60	Loam, clay loam	CL	A-6, A-7	0	0-3	90-100	90-100	85-100	60-100	25-45	10-20

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
198A:												
Elburn	0-15	Silt loam	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-25
	15-44	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-50	15-35
	44-51	Loam, sandy loam, clay loam.	CL, CL-ML, SC, SC-SM	A-2, A-4, A-6	0	0	90-100	80-100	60-90	25-85	20-40	5-20
	51-60	Sandy loam, loamy sand, loam.	SM, SP-SM	A-2, A-3	0	0	90-100	80-100	60-90	15-60	0-20	NP-5
199B:												
Plano	0-16	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-30	5-15
	16-45	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	90-100	25-40	10-25
	45-60	Clay loam, loam, sandy loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	0-1	90-100	85-95	60-90	35-75	20-45	5-25
208A:												
Sexton	0-12	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-40	4-15
	12-36	Silty clay loam, silty clay.	CH, CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	15-30
	36-60	Stratified silty clay loam to sandy loam.	CL, CL-ML	A-4, A-6, A-7	0	0	100	90-100	60-90	50-90	25-45	4-20
214B:												
Hosmer	0-10	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	85-100	22-40	NP-17
	10-38	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7-6	0	0	100	100	95-100	85-100	23-48	4-27
	38-60	Silt loam, silty clay loam.	CL	A-4, A-6	0	0	100	100	90-100	70-95	24-40	8-24

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
219A:												
Millbrook-------	0-9	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	100	95-100	85-100	20-35	3-15
	9-14	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	20-35	5-15
	14-28	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	0	100	100	95-100	85-100	30-45	10-25
	28-41	Clay loam, loam, sandy loam.	CL, SC	A-6, A-7	0-1	0-5	95-100	90-100	70-90	40-80	25-50	10-25
	41-60	Stratified loamy sand to clay loam.	CL, ML, SC, SM	A-2, A-4, A-6	0-1	0-5	95-100	90-100	70-95	30-80	0-30	NP-15
242A:												
Kendall---------	0-12	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	20-35	5-15
	12-42	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	30-45	10-20
	42-60	Stratified sandy loam to silt loam.	CL, CL-ML, SC, SC-SM	A-2, A-4	0	0-5	90-100	80-95	60-90	30-80	0-25	4-10
243B:												
St. Charles-----	0-10	Silt loam------	CL	A-4, A-6	0	0	100	100	95-100	95-100	22-35	7-15
	10-50	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	90-100	30-40	10-20
	50-60	Clay loam, silt loam, sandy loam.	CL, SC	A-4, A-6	0	0	90-100	75-100	75-95	40-80	20-35	8-20
291B:												
Xenia-----------	0-7	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	20-35	5-15
	7-34	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-45	15-25
	34-52	Clay loam, loam	CL	A-6, A-7	0	0-5	90-100	85-95	70-95	50-80	30-45	10-25
	52-60	Loam-----------	CL, CL-ML	A-4, A-6	0	0-5	90-95	85-95	65-95	50-75	20-30	5-15
322B:												
Russell---------	0-13	Silt loam------	CL, CL-ML, ML	A-4	0	0	100	100	90-100	70-90	0-25	3-8
	13-28	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	28-47	Clay loam, loam	CL	A-6	0	0	95-100	90-95	80-95	60-80	30-35	10-15
	47-60	Loam-----------	CL, CL-ML	A-4	0	0-3	85-95	80-90	65-90	50-75	0-25	4-8

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
322C2:												
Russell---------	0-7	Silt loam------	CL, CL-ML, ML	A-4	0	0	100	100	90-100	70-90	0-25	3-8
	7-27	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	27-56	Clay loam, loam	CL	A-6	0	0	95-100	90-95	80-95	60-80	30-35	10-15
	56-60	Loam-----------	CL, CL-ML	A-4	0	0-3	85-95	80-90	65-90	50-75	0-25	4-8
330A:												
Peotone---------	0-12	Silty clay loam	CH, CL	A-7	0	0	100	95-100	95-100	80-100	40-65	15-35
	12-49	Silty clay loam, silty clay.	CH, CL	A-7	0	0-5	100	95-100	90-100	85-100	40-70	15-40
	49-60	Silty clay loam, silt loam.	CH, CL, MH, ML	A-6, A-7	0	0-5	95-100	95-100	90-100	75-98	30-60	15-30
344B:												
Harvard---------	0-9	Silt loam------	CL	A-4, A-6	0	0	100	95-100	90-100	85-100	30-40	8-15
	9-26	Silty clay loam, silt loam.	CL, ML	A-6, A-7	0	0	100	90-100	90-100	85-100	35-45	10-20
	26-38	Clay loam, loam, sandy loam.	CL, ML	A-4, A-6, A-7	0	0-3	95-100	85-95	75-90	55-85	30-45	5-20
	38-60	Stratified sandy clay loam to loamy sand.	CL, CL-ML, SC-SM, SM	A-2, A-4, A-6, A-7	0	0-5	90-100	80-95	40-90	15-70	20-45	NP-20
348B:												
Wingate---------	0-9	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-35	7-15
	9-12	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	25-35	7-15
	12-27	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	90-100	34-43	14-21
	27-52	Clay loam, loam	CL, CL-ML	A-6, A-4	0	0-3	90-100	90-100	70-95	45-80	30-39	11-18
	52-60	Loam-----------	CL, CL-ML	A-4, A-6	0	0-3	85-100	85-100	70-95	45-75	25-35	7-15
353A:												
Toronto---------	0-12	Silt loam------	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	25-35	5-15
	12-26	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-50	20-30
	26-44	Clay loam, loam	CL	A-6, A-7	0	0	95-100	90-95	85-95	65-75	35-50	15-25
	44-60	Loam-----------	CL, CL-ML	A-4, A-6	0	0-3	85-95	80-90	75-85	50-65	15-30	5-15

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
481A:												
Raub	0-16	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	75-95	25-35	5-15
	16-31	Silty clay loam	CH, CL	A-6, A-7	0	0	100	100	95-100	80-95	35-55	20-35
	31-52	Clay loam, silty clay loam.	CL	A-6, A-7	0	0	95-100	90-100	85-95	60-85	35-50	15-25
	52-60	Loam, clay loam	CL, ML, SC, SM	A-4, A-6	0	0-5	85-95	80-90	70-85	40-65	15-30	NP-15
496A:												
Fincastle	0-14	Silt loam	CL, CL-ML, ML	A-4	0	0	100	95-100	90-100	75-93	0-25	3-10
	14-34	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-15
	34-60	Clay loam, loam	CL	A-6	0	0	95-100	90-98	85-95	60-85	30-40	10-15
551F:												
Gosport	0-4	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	90-100	90-100	70-100	25-40	5-15
	4-26	Clay, silty clay, silty clay loam.	CH	A-7	0	0	100	90-100	90-100	85-100	50-65	35-50
	26-60	Weathered bedrock.	---	---	0	0	0	0	0	0	---	NP
551G:												
Gosport	0-4	Loam	CL, CL-ML	A-4, A-6	0	0	100	90-100	90-100	70-100	25-40	5-15
	4-26	Clay, silty clay, silty clay loam.	CH	A-7	0	0	100	90-100	90-100	85-100	50-65	35-50
	26-60	Weathered bedrock.	---	---	0	0	0	0	0	0	---	NP
570B2:												
Martinsville	0-8	Loam	CL, CL-ML, ML	A-4	0	0	100	85-100	75-100	65-90	0-25	3-8
	8-36	Clay loam, silty clay loam, sandy clay loam.	CL, SC	A-2-4, A-2-6, A-4, A-6	0	0	95-100	85-100	70-100	30-95	25-40	7-15
	36-48	Sandy loam, loam, loamy sand.	CL, CL-ML, SC, SC-SM	A-2-4, A-2-6, A-4, A-6	0	0	95-100	85-100	55-95	30-95	20-30	5-11
	48-60	Stratified sand to silt loam.	CL-ML, ML, SC-SM, SM	A-1, A-2-4, A-4	0	0	95-100	85-100	45-95	10-75	0-25	NP-8

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
618C2:												
Senachwine------	0-8	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	95-100	90-100	80-95	60-85	20-30	5-15
	8-37	Clay loam, silty clay loam.	CL	A-6, A-7-6	0	0	90-98	85-98	85-95	55-85	35-45	15-20
	37-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-1	0-3	90-98	85-98	75-95	50-75	25-35	5-15
618C3:												
Senachwine------	0-6	Clay loam------	CL, ML	A-6, A-7-6	0	0	95-100	90-100	85-100	60-100	35-45	15-20
	6-21	Clay loam, silty clay loam.	CL	A-6, A-7-6	0	0	90-98	85-98	85-95	55-85	35-45	15-20
	21-34	Loam, clay loam	CL, CL-ML	A-4, A-6	0-1	0-3	90-98	85-98	75-95	50-75	30-35	10-15
	34-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-1	0-3	90-98	85-98	75-95	50-75	25-35	5-15
618D2:												
Senachwine------	0-8	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	95-100	90-100	80-95	60-85	20-30	5-15
	8-37	Clay loam, silty clay loam.	CL	A-6, A-7-6	0	0	90-98	85-98	85-95	55-85	35-45	15-20
	37-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-1	0-3	90-98	85-98	75-95	50-75	25-35	5-15
618D3:												
Senachwine------	0-6	Clay loam------	CL, ML	A-6, A-7-6	0	0	95-100	90-100	85-100	60-100	35-45	15-20
	6-21	Clay loam, silty clay loam.	CL	A-6, A-7-6	0	0	90-98	85-98	85-95	55-85	35-45	15-20
	21-34	Loam, clay loam	CL, CL-ML	A-4, A-6	0-1	0-3	90-98	85-98	75-95	50-75	30-35	10-15
	34-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-1	0-3	90-98	85-98	75-95	50-75	25-35	5-15
618F:												
Senachwine------	0-9	Loam----------	CL, CL-ML, ML	A-4, A-6	0	0	95-100	90-100	80-95	60-85	20-30	5-15
	9-38	Clay loam, silty clay loam.	CL	A-6, A-7-6	0	0	90-98	85-98	85-95	55-85	35-45	15-20
	38-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-1	0-3	90-98	85-98	75-95	50-75	25-35	5-15
618G:												
Senachwine------	0-9	Loam----------	CL, CL-ML, ML	A-4, A-6	0	0	95-100	90-100	80-95	60-85	20-30	5-15
	9-38	Clay loam, silty clay loam.	CL	A-6, A-7-6	0	0	90-98	85-98	85-95	55-85	35-45	15-20
	38-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-1	0-3	90-98	85-98	75-95	50-75	25-35	5-15

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
622B2:												
Wyanet----------	0-6	Silt loam------	CL, CL-ML	A-4, A-6	0	0	95-100	95-100	80-100	50-90	20-30	5-15
	6-30	Clay loam, loam, silty clay loam.	CL	A-6	0	0	90-100	90-100	75-100	50-95	30-35	15-20
	30-60	Loam-----------	CL, CL-ML	A-4	0	0-3	85-95	85-95	75-85	50-75	20-30	5-10
622C2:												
Wyanet----------	0-6	Silt loam------	CL, CL-ML	A-4, A-6	0	0	95-100	95-100	80-100	50-90	20-30	5-15
	6-32	Clay loam, loam, silty clay loam.	CL	A-6	0	0	90-100	90-100	75-100	50-95	30-35	15-20
	32-60	Loam-----------	CL, CL-ML	A-4	0	0-3	85-95	85-95	75-85	50-75	20-30	5-10
809F:												
Orthents--------	0-3	Loam-----------	CL, CL-ML	A-4, A-6	0	0-3	90-95	70-75	60-70	50-60	20-40	5-20
	3-60	Very channery loam, very channery sandy clay loam, very channery clay loam.	CL, CL-ML	A-4, A-6	0	15-25	85-95	70-75	60-70	50-60	20-40	5-20
813F:												
Orthents--------	0-6	Silty clay loam	CL	A-6, A-7	0	0-2	95-100	95-100	90-100	80-95	36-43	15-22
	6-10	Silty clay loam, silt loam, clay loam, silty clay.	CL	A-6, A-7	0	0-2	95-100	90-100	90-100	70-95	29-45	10-19
	10-60	Weathered bedrock.	---	---	0	0	0	0	0	0	---	NP
Pits.												

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
823A:												
Schuline--------	0-9	Silty clay loam	CL	A-6, A-7	0-1	0-2	90-100	85-100	80-95	75-90	30-50	10-25
	9-16	Loam, silty clay loam, clay loam.	CL	A-6, A-7	0-2	0-5	90-100	85-100	80-95	70-85	30-50	10-25
	16-40	Loam, silty clay loam, clay loam.	CL	A-4, A-6, A-7	0-5	0-15	85-95	85-90	75-85	60-80	25-50	7-25
	40-60	Loam, clay loam, silty clay.	CH, CL, MH, ML	A-6, A-7	0-5	0-15	85-95	80-90	75-85	60-80	35-55	10-30
823B:												
Schuline--------	0-7	Silty clay loam	CL	A-6, A-7	0-1	0-2	90-100	85-100	80-95	75-90	30-50	10-25
	7-37	Loam, silty clay loam, clay loam.	CL	A-6, A-7	0-2	0-5	90-100	85-100	80-95	70-85	30-50	10-25
	37-51	Loam, silty clay loam, clay loam.	CL	A-4, A-6, A-7	0-5	0-15	85-95	85-90	75-85	60-80	25-50	7-25
	51-60	Weathered bedrock.	---	---	0	0	0	0	0	0	---	NP
3424A:												
Shoals----------	0-8	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	90-100	50-100	20-40	3-20
	8-60	Silt loam, loam, clay loam.	CL, CL-ML, ML	A-4, A-6, A-7-6	0	0	100	95-100	75-100	50-100	20-50	3-30
3450A:												
Brouillett------	0-11	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	0	90-100	90-100	80-100	65-95	20-35	NP-12
	11-26	Silt loam, loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	0	90-100	85-100	70-100	55-95	22-45	3-20
	26-42	Silt loam, loam, clay loam.	CL, CL-ML	A-6	0	0	90-100	85-100	70-100	55-95	20-40	3-20
	42-60	Stratified sandy loam to silt loam.	CL, ML, SC-SM	A-2-4, A-4, A-6	0	0-5	65-100	45-100	30-100	25-80	10-35	NP-12

Table 15.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
8431A:												
Genesee	0-7	Sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	60-85	35-55	0-25	3-8
	7-46	Silt loam, loam	CL, ML	A-4, A-6	0	0	100	100	90-100	75-90	26-40	3-15
	46-60	Stratified silt loam to loamy sand.	CL, CL-ML, ML, SP-SM	A-4, A-6	0	0	90-100	85-100	60-90	40-90	20-35	3-15
8665A:												
Stonelick	0-9	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	85-100	75-100	45-75	25-55	0-24	NP-6
	9-60	Stratified loam to loamy fine sand.	SM, SP-SM	A-1-b, A-2, A-3, A-4	0	0	85-100	75-100	40-60	5-40	0-15	NP

Table 16.—Physical and Chemical Properties of the Soils

(Entries under "Erosion factors—T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Cation-exchange capacity	Soil reaction	Shrink-swell potential	Organic matter	Erosion factors		Wind erodibility group
										K	T	
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
5C2:												
Blair	0-5	20-27	1.35-1.55	0.60-2.00	0.15-0.24	14.0-22.0	5.1-7.3	Low	1.0-3.0	0.32	5	6
	5-19	25-35	1.45-1.60	0.20-0.60	0.16-0.21	15.0-22.0	4.5-6.0	Moderate	0.0-0.5	0.37		
	19-49	18-35	1.45-1.60	0.20-0.60	0.16-0.21	11.0-22.0	5.1-7.8	Moderate	0.0-0.3	0.37		
	49-60	20-30	1.35-1.60	0.20-0.60	0.19-0.22	12.0-18.0	5.6-7.8	Low	0.0-0.1	0.37		
7D2:												
Atlas	0-5	20-27	1.30-1.50	0.20-0.60	0.20-0.25	14.0-22.0	4.5-7.3	Moderate	1.0-3.0	0.32	3	6
	5-47	35-45	1.35-1.55	0.01-0.06	0.07-0.19	21.0-29.0	4.5-7.3	High	0.0-1.0	0.28		
	47-60	27-30	1.35-1.60	0.06-0.20	0.07-0.18	16.0-20.0	6.1-7.8	Moderate	0.0-1.0	0.28		
8F:												
Hickory	0-8	19-25	1.30-1.50	0.60-2.00	0.20-0.22	13.0-19.0	4.5-7.3	Low	1.0-2.0	0.32	5	6
	8-48	24-35	1.45-1.65	0.60-2.00	0.15-0.19	14.0-22.0	4.5-7.3	Moderate	0.0-0.5	0.32		
	48-60	15-30	1.50-1.75	0.60-2.00	0.10-0.15	9.0-19.0	5.6-8.4	Low	0.0-0.5	0.32		
8G:												
Hickory	0-8	19-25	1.30-1.50	0.60-2.00	0.20-0.22	13.0-19.0	4.5-7.3	Low	1.0-2.0	0.32	5	6
	8-48	24-35	1.45-1.65	0.60-2.00	0.15-0.19	14.0-22.0	4.5-7.3	Moderate	0.0-0.5	0.32		
	48-60	15-30	1.50-1.75	0.60-2.00	0.10-0.15	9.0-19.0	5.6-8.4	Low	0.0-0.5	0.32		
50A:												
Virden	0-11	20-27	1.20-1.40	0.60-2.00	0.21-0.24	18.0-28.0	5.6-7.8	Moderate	3.0-6.0	0.28	5	6
	11-60	35-42	1.20-1.45	0.20-0.60	0.11-0.20	21.0-29.0	5.6-7.8	High	0.0-2.0	0.37		
56B:												
Dana	0-12	18-27	1.25-1.50	0.60-2.00	0.22-0.24	17.0-26.0	5.6-7.3	Low	3.0-5.0	0.28	5	5
	12-29	27-35	1.25-1.55	0.60-2.00	0.18-0.20	17.0-23.0	5.1-7.3	Moderate	0.5-1.0	0.37		
	29-46	27-35	1.40-1.70	0.60-2.00	0.15-0.19	17.0-22.0	5.6-7.3	Moderate	0.2-0.5	0.32		
	46-60	15-30	1.40-1.75	0.20-0.60	0.05-0.10	9.0-19.0	6.6-8.4	Low	0.2-0.5	0.37		
56B2:												
Dana	0-12	18-27	1.25-1.50	0.60-2.00	0.22-0.24	17.0-26.0	5.6-7.3	Low	3.0-5.0	0.28	5	5
	12-29	27-35	1.25-1.55	0.60-2.00	0.18-0.20	17.0-23.0	5.1-7.3	Moderate	0.5-1.0	0.37		
	29-46	27-35	1.40-1.70	0.60-2.00	0.15-0.19	17.0-22.0	5.6-7.3	Moderate	0.2-0.5	0.32		
	46-60	15-30	1.40-1.75	0.20-0.60	0.05-0.10	9.0-19.0	6.6-8.4	Low	0.2-0.5	0.37		
67A:												
Harpster	0-12	27-35	1.05-1.25	0.60-2.00	0.21-0.24	26.0-33.0	7.4-8.4	Moderate	5.0-6.0	0.24	5	4L
	12-35	27-35	1.20-1.50	0.60-2.00	0.18-0.22	17.0-23.0	7.4-8.4	Moderate	0.5-1.0	0.37		
	35-41	22-35	1.25-1.55	0.60-2.00	0.17-0.22	13.0-22.0	7.4-8.4	Moderate	0.0-0.5	0.37		
	41-60	15-30	1.40-1.60	0.60-2.00	0.11-0.22	9.0-18.0	7.4-8.4	Low	0.0-0.1	0.37		
69A:												
Milford	0-13	35-40	1.30-1.50	0.60-2.00	0.20-0.23	31.0-36.0	5.6-7.3	High	5.0-6.0	0.20	5	4
	13-47	35-42	1.40-1.60	0.20-0.60	0.18-0.20	22.0-29.0	5.6-7.8	Moderate	0.5-2.0	0.32		
	47-60	15-30	1.50-1.70	0.20-0.60	0.20-0.22	9.0-20.0	6.6-8.4	Moderate	0.0-1.0	0.43		
104A:												
Virgil	0-7	15-27	1.15-1.35	0.60-2.00	0.22-0.24	13.0-24.0	6.1-7.8	Low	2.0-4.0	0.37	5	6
	7-10	15-27	1.15-1.35	0.60-2.00	0.22-0.24	9.0-17.0	5.1-7.3	Low	0.2-0.5	0.43		
	10-43	27-35	1.35-1.55	0.60-2.00	0.18-0.20	17.0-23.0	5.1-7.8	Moderate	0.2-1.0	0.37		
	43-60	15-30	1.45-1.75	0.60-6.00	0.05-0.11	9.0-19.0	5.6-8.4	Low	0.2-0.5	0.28		

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Cation-exchange capacity	Soil reaction	Shrink-swell potential	Organic matter	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
112A:												
Cowden	0-8	17-27	1.30-1.50	0.60-2.00	0.22-0.25	14.0-22.0	5.6-7.3	Low	2.0-3.0	0.37	5	6
	8-17	17-27	1.25-1.45	0.06-0.20	0.18-0.20	10.0-17.0	4.5-6.0	Low	0.0-0.5	0.49		
	17-46	35-42	1.35-1.60	0.06-0.20	0.12-0.20	21.0-27.0	4.5-7.3	High	0.0-1.0	0.37		
	46-60	20-27	1.50-1.70	0.20-0.60	0.17-0.22	12.0-17.0	5.6-7.8	Moderate	0.0-0.5	0.49		
113A:												
Oconee	0-9	20-27	1.20-1.30	0.60-2.00	0.22-0.24	16.0-22.0	5.6-7.8	Moderate	2.0-3.0	0.37	5	6
	9-12	18-27	1.30-1.45	0.06-0.20	0.20-0.22	11.0-17.0	4.5-7.3	Moderate	0.0-0.5	0.49		
	12-33	35-42	1.30-1.50	0.06-0.20	0.11-0.17	21.0-27.0	4.5-6.0	High	0.0-1.0	0.37		
	33-56	20-35	1.40-1.60	0.06-0.20	0.16-0.21	12.0-22.0	5.1-6.5	Moderate	0.0-0.5	0.49		
	56-60	17-27	1.40-1.60	0.06-0.20	0.20-0.22	10.0-17.0	5.6-8.4	Moderate	0.0-0.5	0.49		
132A:												
Starks	0-13	18-27	1.15-1.35	0.60-2.00	0.22-0.24	13.0-22.0	5.1-7.3	Low	1.0-3.0	0.43	5	6
	13-30	27-35	1.35-1.55	0.60-2.00	0.18-0.20	17.0-23.0	4.5-6.5	Moderate	0.5-1.0	0.37		
	30-40	10-30	1.45-1.65	0.60-2.00	0.16-0.19	6.0-19.0	5.1-7.8	Moderate	0.2-0.5	0.28		
	40-60	5-30	1.55-1.75	0.60-2.00	0.08-0.18	3.0-19.0	5.1-7.8	Low	0.2-0.5	0.28		
134A:												
Camden	0-10	14-27	1.35-1.55	0.60-2.00	0.21-0.25	10.0-20.0	5.1-7.3	Low	1.0-2.0	0.43	5	6
	10-33	22-35	1.40-1.60	0.60-2.00	0.14-0.24	13.0-22.0	5.1-7.3	Moderate	0.1-0.5	0.37		
	33-41	18-30	1.45-1.65	0.60-2.00	0.11-0.22	11.0-19.0	5.1-7.3	Low	0.0-0.5	0.28		
	41-60	5-20	1.40-1.70	0.60-6.00	0.12-0.22	3.0-13.0	5.1-8.4	Low	0.0-0.5	0.28		
134B:												
Camden	0-10	14-27	1.35-1.55	0.60-2.00	0.21-0.25	10.0-20.0	5.1-7.3	Low	1.0-2.0	0.43	5	6
	10-33	22-35	1.40-1.60	0.60-2.00	0.14-0.24	13.0-22.0	4.5-7.3	Moderate	0.1-0.5	0.37		
	33-41	18-30	1.45-1.65	0.60-2.00	0.11-0.22	11.0-19.0	5.1-7.3	Low	0.0-0.5	0.28		
	41-60	5-20	1.40-1.70	0.60-6.00	0.12-0.22	3.0-13.0	5.1-8.4	Low	0.0-0.5	0.28		
134C2:												
Camden	0-8	14-27	1.35-1.55	0.60-2.00	0.21-0.25	10.0-20.0	5.1-7.3	Low	1.0-2.0	0.43	5	6
	8-29	22-35	1.40-1.60	0.60-2.00	0.14-0.24	13.0-22.0	4.5-7.3	Moderate	0.1-0.5	0.37		
	29-48	18-30	1.45-1.65	0.60-2.00	0.11-0.22	11.0-19.0	4.5-7.3	Low	0.0-0.5	0.28		
	48-60	5-20	1.40-1.70	0.60-6.00	0.12-0.22	3.0-13.0	4.5-8.4	Low	0.0-0.5	0.28		
148A:												
Proctor	0-13	18-27	1.10-1.30	0.60-2.00	0.22-0.24	15.0-24.0	5.1-7.8	Low	2.0-4.0	0.28	5	6
	13-25	25-35	1.20-1.45	0.60-2.00	0.18-0.20	16.0-25.0	5.6-7.3	Moderate	0.5-2.0	0.37		
	25-45	18-32	1.30-1.55	0.60-6.00	0.13-0.16	11.0-21.0	5.6-7.3	Moderate	0.2-1.0	0.28		
	45-60	10-20	1.40-1.70	0.60-6.00	0.07-0.19	6.0-13.0	6.1-7.8	Low	0.2-0.5	0.17		
148B:												
Proctor	0-13	18-27	1.10-1.30	0.60-2.00	0.22-0.24	15.0-24.0	5.1-7.8	Low	2.0-4.0	0.28	5	6
	13-25	25-35	1.20-1.45	0.60-2.00	0.18-0.20	16.0-25.0	5.6-7.3	Moderate	0.5-2.0	0.37		
	25-45	18-32	1.30-1.55	0.60-6.00	0.13-0.16	11.0-21.0	5.6-7.3	Moderate	0.2-1.0	0.28		
	45-60	10-20	1.40-1.70	0.60-6.00	0.07-0.19	6.0-13.0	6.1-7.8	Low	0.2-0.5	0.17		
149A:												
Brenton	0-13	20-27	1.25-1.45	0.60-2.00	0.22-0.26	18.0-26.0	5.6-7.8	Low	3.0-5.0	0.28	5	6
	13-30	25-35	1.30-1.55	0.60-2.00	0.18-0.20	15.0-23.0	5.6-7.3	Moderate	0.0-1.0	0.37		
	30-45	20-30	1.40-1.60	0.60-2.00	0.15-0.19	12.0-19.0	5.6-7.8	Moderate	0.0-0.5	0.28		
	45-60	10-30	1.50-1.70	0.60-2.00	0.11-0.20	6.0-19.0	5.6-8.4	Low	0.0-0.5	0.28		
152A:												
Drummer	0-13	27-35	1.10-1.30	0.60-2.00	0.21-0.23	26.0-35.0	5.6-7.8	Moderate	5.0-7.0	0.24	5	7
	13-46	20-35	1.20-1.45	0.60-2.00	0.21-0.24	12.0-23.0	5.6-7.8	Moderate	0.0-1.0	0.37		
	46-56	15-33	1.30-1.55	0.60-2.00	0.17-0.20	9.0-21.0	6.1-8.4	Moderate	0.0-0.5	0.28		
	56-60	10-32	1.40-1.70	0.60-2.00	0.11-0.19	6.0-20.0	6.6-8.4	Low	0.0-0.5	0.28		

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Cation-exchange capacity	Soil reaction	Shrink-swell potential	Organic matter	Erosion factors		Wind erodibility group
										K	T	
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
153A:												
Pella	0-12	27-35	1.10-1.30	0.60-2.00	0.21-0.23	26.0-33.0	6.1-7.8	Moderate	5.0-6.0	0.24	5	7
	12-36	27-35	1.20-1.45	0.60-2.00	0.21-0.24	17.0-23.0	6.6-7.8	Moderate	0.5-1.0	0.37		
	36-43	15-30	1.35-1.60	0.60-2.00	0.15-0.20	9.0-19.0	7.4-8.4	Moderate	0.2-0.5	0.28		
	43-60	15-30	1.40-1.70	0.60-2.00	0.10-0.22	9.0-18.0	7.4-8.4	Low	0.0-0.2	0.28		
154A:												
Flanagan	0-18	20-30	1.20-1.40	0.60-2.00	0.22-0.24	20.0-26.0	5.1-7.3	Moderate	4.0-5.0	0.28	5	6
	18-53	27-42	1.25-1.45	0.60-2.00	0.15-0.22	21.0-26.0	5.6-7.3	High	0.0-1.0	0.37		
	53-60	20-30	1.45-1.70	0.20-0.60	0.15-0.22	12.0-18.0	6.1-8.4	Low	0.0-0.5	0.32		
164A:												
Stoy	0-14	20-27	1.20-1.40	0.20-0.60	0.22-0.24	14.0-20.0	4.5-7.3	Low	1.0-2.0	0.43	5	6
	14-31	27-35	1.35-1.55	0.06-0.20	0.18-0.20	17.0-22.0	4.5-5.5	Moderate	0.2-0.5	0.37		
	31-49	27-35	1.55-1.75	0.06-0.20	0.09-0.12	17.0-22.0	4.5-5.5	Moderate	0.2-0.5	0.37		
	49-60	20-27	1.55-1.75	0.06-0.20	0.10-0.15	12.0-17.0	4.5-6.0	Low	0.2-0.5	0.49		
164B:												
Stoy	0-14	20-27	1.20-1.40	0.20-0.60	0.22-0.24	14.0-20.0	4.5-7.3	Low	1.0-2.0	0.43	5	6
	14-31	27-35	1.35-1.55	0.06-0.20	0.18-0.20	17.0-22.0	4.5-5.5	Moderate	0.2-0.5	0.37		
	31-49	27-35	1.55-1.75	0.06-0.20	0.09-0.12	17.0-22.0	4.5-5.5	Moderate	0.2-0.5	0.37		
	49-60	20-27	1.55-1.75	0.06-0.20	0.10-0.15	12.0-17.0	4.5-6.0	Low	0.2-0.5	0.49		
165A:												
Weir	0-8	12-27	1.30-1.50	0.20-0.60	0.22-0.24	9.0-22.0	4.5-7.8	Low	1.0-3.0	0.43	5	6
	8-18	12-20	1.40-1.55	0.06-0.20	0.17-0.20	7.0-13.0	4.5-7.8	Low	0.2-0.5	0.55		
	18-60	25-40	1.40-1.60	0.01-0.06	0.18-0.20	15.0-25.0	4.5-5.5	High	0.2-0.5	0.37		
171B:												
Catlin	0-17	18-27	1.25-1.45	0.60-2.00	0.23-0.26	17.0-24.0	5.1-7.3	Low	3.0-4.0	0.28	5	6
	17-46	25-35	1.25-1.55	0.60-2.00	0.18-0.20	15.0-23.0	5.1-7.3	Moderate	0.0-1.0	0.37		
	46-60	20-30	1.40-1.70	0.60-2.00	0.07-0.11	12.0-19.0	6.1-8.4	Low	0.0-0.5	0.32		
198A:												
Elburn	0-15	22-27	1.10-1.30	0.60-2.00	0.22-0.24	21.0-30.0	5.6-7.8	Low	4.0-5.0	0.28	5	6
	15-44	25-35	1.20-1.40	0.60-2.00	0.18-0.20	16.0-25.0	5.6-7.8	Moderate	0.5-2.0	0.37		
	44-51	15-30	1.50-1.70	0.60-6.00	0.12-0.18	9.0-18.0	6.1-8.4	Low	0.0-0.2	0.28		
	51-60	2-15	1.50-1.75	6.00-20.00	0.06-0.10	1.0-9.0	6.1-8.4	Low	0.0-0.2	0.24		
199B:												
Plano	0-16	18-27	1.10-1.30	0.60-2.00	0.22-0.24	17.0-26.0	6.1-7.3	Low	3.0-5.0	0.28	5	6
	16-45	20-35	1.20-1.40	0.60-2.00	0.18-0.20	12.0-23.0	5.1-7.3	Moderate	0.2-1.0	0.37		
	45-60	15-32	1.30-1.55	0.60-6.00	0.09-0.16	9.0-20.0	5.6-7.8	Low	0.1-0.5	0.28		
208A:												
Sexton	0-12	18-27	1.20-1.40	0.60-2.00	0.22-0.24	13.0-22.0	5.6-7.8	Low	1.0-3.0	0.43	5	6
	12-36	35-42	1.35-1.55	0.06-0.20	0.15-0.20	22.0-27.0	5.1-6.0	High	0.5-1.0	0.37		
	36-60	15-35	1.40-1.70	0.20-0.60	0.15-0.20	9.0-22.0	6.1-7.8	Moderate	0.0-0.5	0.32		
214B:												
Hosmer	0-10	10-24	1.20-1.60	0.60-2.00	0.18-0.24	8.0-18.0	4.5-7.3	Low	1.0-2.0	0.43	4	5
	10-38	24-30	1.40-1.70	0.60-2.00	0.15-0.21	14.0-20.0	4.5-6.0	Moderate	0.0-1.0	0.49		
	38-60	18-30	1.55-1.85	0.01-0.06	0.06-0.08	11.0-19.0	4.5-5.5	Low	0.0-0.5	0.49		
219A:												
Millbrook	0-9	18-27	1.40-1.60	0.60-2.00	0.22-0.24	15.0-24.0	5.1-7.8	Low	2.0-4.0	0.37	5	6
	9-14	15-27	1.40-1.60	0.60-2.00	0.22-0.24	10.0-18.0	5.1-7.3	Low	0.5-1.0	0.43		
	14-28	25-35	1.45-1.65	0.60-2.00	0.18-0.20	15.0-23.0	5.1-7.3	Moderate	0.0-1.0	0.37		
	28-41	18-35	1.45-1.70	0.60-2.00	0.12-0.19	11.0-22.0	5.1-7.3	Moderate	0.0-0.5	0.28		
	41-60	10-25	1.50-1.75	0.60-2.00	0.11-0.19	6.0-16.0	5.6-8.4	Low	0.0-0.5	0.24		

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Cation-exchange capacity	Soil reaction	Shrink-swell potential	Organic matter	Erosion factors		Wind erodibility group
										K	T	
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
242A:												
Kendall---	0-12	20-27	1.15-1.30	0.60-2.00	0.22-0.24	14.0-22.0	5.1-7.3	Low---	1.0-3.0	0.43	5	6
	12-42	27-35	1.30-1.50	0.60-2.00	0.18-0.20	16.0-22.0	4.5-7.3	Moderate	0.0-0.5	0.37		
	42-60	10-30	1.55-1.70	0.60-2.00	0.11-0.22	6.0-19.0	5.6-8.4	Low---	0.0-0.5	0.28		
243B:												
St. Charles---	0-10	20-27	1.15-1.30	0.60-2.00	0.22-0.24	14.0-22.0	5.1-7.8	Low---	1.0-3.0	0.43	5	6
	10-50	25-35	1.30-1.50	0.60-2.00	0.18-0.20	15.0-22.0	4.5-7.3	Moderate	0.0-0.5	0.37		
	50-60	15-30	1.30-1.50	0.60-2.00	0.11-0.16	9.0-19.0	5.1-7.3	Low---	0.0-0.5	0.28		
291B:												
Xenia---	0-7	11-22	1.30-1.50	0.60-2.00	0.22-0.24	9.0-19.0	5.6-7.3	Low---	1.0-3.0	0.43	4	5
	7-34	27-35	1.45-1.65	0.60-2.00	0.18-0.20	17.0-23.0	5.1-7.3	Moderate	0.2-1.0	0.37		
	34-52	24-35	1.45-1.65	0.20-0.60	0.15-0.19	14.0-23.0	5.6-7.8	Moderate	0.0-1.0	0.32		
	52-60	12-20	1.70-1.90	0.20-0.60	0.05-0.10	7.0-13.0	7.4-8.4	Low---	0.0-0.5	0.37		
322B:												
Russell---	0-13	10-20	1.30-1.45	0.60-2.00	0.22-0.24	7.0-16.0	5.6-7.8	Low---	0.5-2.0	0.43	4	5
	13-28	25-35	1.35-1.50	0.60-2.00	0.18-0.20	16.0-23.0	5.6-6.5	Moderate	0.5-1.0	0.37		
	28-47	25-32	1.40-1.60	0.60-2.00	0.15-0.19	15.0-21.0	5.6-7.3	Moderate	0.0-1.0	0.32		
	47-60	12-20	1.70-1.90	0.20-0.60	0.05-0.10	7.0-13.0	7.4-8.4	Low---	0.0-0.5	0.37		
322C2:												
Russell---	0-7	10-20	1.30-1.45	0.60-2.00	0.22-0.24	5.0-16.0	5.6-7.8	Low---	0.5-2.0	0.43	4	5
	7-27	25-35	1.35-1.50	0.60-2.00	0.18-0.20	11.0-23.0	5.6-6.5	Moderate	0.5-1.0	0.37		
	27-56	25-32	1.40-1.60	0.60-2.00	0.15-0.19	10.0-21.0	5.6-7.3	Moderate	0.0-1.0	0.32		
	56-60	12-20	1.70-1.90	0.20-0.60	0.05-0.10	4.0-13.0	7.4-8.4	Low---	0.0-0.5	0.37		
330A:												
Peotone---	0-12	33-40	1.20-1.40	0.20-0.60	0.21-0.23	30.0-38.0	5.6-7.8	High---	5.0-7.0	0.24	5	4
	12-49	35-45	1.30-1.60	0.20-0.60	0.11-0.20	22.0-31.0	6.1-7.8	High---	0.5-2.0	0.37		
	49-60	25-40	1.40-1.65	0.20-0.60	0.18-0.20	15.0-26.0	6.6-8.4	High---	0.2-1.0	0.37		
344B:												
Harvard---	0-9	20-27	1.15-1.35	0.60-2.00	0.22-0.24	16.0-22.0	5.1-7.8	Low---	2.0-3.0	0.37	5	6
	9-26	25-35	1.25-1.55	0.60-2.00	0.15-0.20	15.0-22.0	5.1-7.3	Moderate	0.0-0.5	0.37		
	26-38	15-35	1.30-1.60	0.60-2.00	0.12-0.19	9.0-22.0	5.6-7.8	Low---	0.0-0.4	0.32		
	38-60	5-30	1.40-1.70	2.00-6.00	0.05-0.15	3.0-19.0	5.1-8.4	Low---	0.0-0.4	0.32		
348B:												
Wingate---	0-9	15-27	1.20-1.40	0.60-2.00	0.22-0.24	13.0-24.0	5.6-7.3	Low---	2.0-4.0	0.37	5	6
	9-12	15-27	1.20-1.45	0.60-2.00	0.21-0.23	10.0-20.0	5.6-7.3	Low---	0.5-2.0	0.43		
	12-27	24-35	1.35-1.55	0.60-2.00	0.18-0.22	15.0-23.0	5.1-7.3	Moderate	0.5-1.0	0.37		
	27-52	20-30	1.40-1.60	0.60-2.00	0.15-0.19	12.0-19.0	5.1-7.8	Moderate	0.0-0.5	0.32		
	52-60	15-27	1.50-1.70	0.20-0.60	0.05-0.10	9.0-17.0	6.6-8.4	Low---	0.0-0.5	0.37		
353A:												
Toronto---	0-12	18-27	1.30-1.45	0.60-2.00	0.22-0.24	17.0-26.0	5.1-6.5	Low---	3.0-5.0	0.37	5	5
	12-26	27-35	1.35-1.50	0.60-2.00	0.18-0.20	17.0-23.0	4.5-6.0	Moderate	0.5-1.0	0.37		
	26-44	25-35	1.50-1.70	0.60-2.00	0.15-0.19	15.0-22.0	5.6-7.3	Moderate	0.0-0.5	0.32		
	44-60	18-27	1.50-1.70	0.20-0.60	0.05-0.19	11.0-17.0	6.6-8.4	Low---	0.0-0.5	0.37		
481A:												
Raub---	0-16	20-27	1.30-1.50	0.60-2.00	0.22-0.24	16.0-24.0	5.6-7.3	Low---	2.0-4.0	0.28	5	6
	16-31	27-35	1.50-1.70	0.20-0.60	0.18-0.20	18.0-25.0	5.1-6.5	Moderate	1.0-2.0	0.37		
	31-52	27-35	1.50-1.70	0.20-0.60	0.15-0.19	16.0-23.0	6.1-7.3	Moderate	0.0-1.0	0.32		
	52-60	20-32	1.50-1.70	0.20-0.60	0.05-0.19	12.0-20.0	7.4-8.4	Low---	0.0-0.5	0.37		
496A:												
Fincastle---	0-14	11-22	1.40-1.55	0.60-2.00	0.22-0.24	9.0-19.0	5.1-7.8	Low---	1.0-3.0	0.43	5	5
	14-34	23-35	1.45-1.65	0.60-2.00	0.18-0.20	14.0-22.0	4.5-6.5	Moderate	0.0-0.5	0.37		
	34-60	24-32	1.45-1.65	0.60-2.00	0.15-0.19	14.0-20.0	5.1-7.8	Moderate	0.0-0.5	0.32		

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Cation-exchange capacity	Soil reaction	Shrink-swell potential	Organic matter	Erosion factors		Wind erodibility group
										K	T	
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
551F:												
Gosport---------	0-4	18-27	1.30-1.40	0.20-0.60	0.18-0.20	15.0-22.0	4.5-6.5	Low------	2.0-3.0	0.43	3	6
	4-26	36-60	1.50-1.60	0.01-0.06	0.12-0.14	30.0-50.0	3.6-5.5	High-----	0.0-0.5	0.32		
	26-60	---	---	0.00-0.06	---	---	---	Low------	---	---		
551G:												
Gosport---------	0-4	18-27	1.30-1.40	0.20-0.60	0.18-0.20	15.0-22.0	4.5-6.5	Low------	2.0-3.0	0.43	3	6
	4-26	36-60	1.50-1.60	0.01-0.06	0.12-0.14	30.0-50.0	3.6-5.5	High-----	0.0-0.5	0.32		
	26-60	---	---	0.00-0.06	---	---	---	Low------	---	---		
570B2:												
Martinsville----	0-8	12-20	1.35-1.45	0.60-2.00	0.20-0.22	8.0-16.0	5.1-7.3	Low------	0.5-2.0	0.32	5	5
	8-36	20-33	1.40-1.60	0.60-2.00	0.16-0.20	12.0-21.0	5.1-6.5	Moderate	0.0-0.5	0.32		
	36-48	15-25	1.40-1.60	0.60-2.00	0.12-0.17	9.0-15.0	5.1-7.3	Low------	0.0-0.2	0.28		
	48-60	2-20	1.50-1.70	0.60-6.00	0.08-0.17	1.0-12.0	5.6-8.4	Low------	0.0-0.2	0.17		
618C2:												
Senachwine------	0-8	11-22	1.20-1.65	0.60-2.00	0.17-0.26	9.0-19.0	5.6-7.3	Low------	1.0-3.0	0.32	5	5
	8-37	27-35	1.40-1.70	0.60-2.00	0.07-0.21	16.0-22.0	5.1-7.3	Moderate	0.0-0.5	0.32		
	37-60	15-30	1.75-1.95	0.20-0.60	0.01-0.03	9.0-19.0	7.4-8.4	Low------	0.0-0.5	0.37		
618C3:												
Senachwine------	0-6	27-35	1.30-1.70	0.60-2.00	0.17-0.23	17.0-23.0	5.6-7.3	Moderate	0.5-1.0	0.32	4	6
	6-21	27-35	1.40-1.70	0.60-2.00	0.07-0.21	16.0-22.0	5.1-7.3	Moderate	0.0-0.5	0.32		
	21-34	20-30	1.60-1.80	0.20-0.60	0.07-0.17	12.0-19.0	6.6-7.8	Low------	0.0-0.5	0.37		
	34-60	15-30	1.75-1.95	0.20-0.60	0.01-0.03	9.0-19.0	7.4-8.4	Low------	0.0-0.5	0.37		
618D2:												
Senachwine------	0-8	11-22	1.20-1.65	0.60-2.00	0.17-0.26	9.0-19.0	5.6-7.3	Low------	1.0-3.0	0.32	5	5
	8-37	27-35	1.40-1.70	0.60-2.00	0.07-0.21	16.0-22.0	5.1-7.3	Moderate	0.0-0.5	0.32		
	37-60	15-30	1.75-1.95	0.20-0.60	0.01-0.03	9.0-19.0	7.4-8.4	Low------	0.0-0.5	0.37		
618D3:												
Senachwine------	0-6	27-35	1.30-1.70	0.60-2.00	0.17-0.23	7.0-23.0	5.6-7.3	Moderate	0.5-1.0	0.32	4	6
	6-21	27-35	1.40-1.70	0.60-2.00	0.07-0.21	16.0-22.0	5.1-7.3	Moderate	0.0-0.5	0.32		
	21-34	20-30	1.60-1.80	0.20-0.60	0.07-0.17	12.0-19.0	6.6-7.8	Low------	0.0-0.5	0.37		
	34-60	15-30	1.75-1.95	0.20-0.60	0.01-0.03	9.0-19.0	7.4-8.4	Low------	0.0-0.5	0.37		
618F:												
Senachwine------	0-9	11-22	1.20-1.65	0.60-2.00	0.17-0.26	9.0-19.0	5.6-7.3	Low------	1.0-3.0	0.32	5	5
	9-38	27-35	1.40-1.70	0.60-2.00	0.07-0.21	16.0-22.0	5.1-7.3	Moderate	0.0-0.5	0.32		
	38-60	15-30	1.75-1.95	0.20-0.60	0.01-0.03	9.0-19.0	7.4-8.4	Low------	0.0-0.5	0.37		
618G:												
Senachwine------	0-9	11-22	1.20-1.65	0.60-2.00	0.17-0.26	9.0-19.0	5.6-7.3	Low------	1.0-3.0	0.32	5	5
	9-38	27-35	1.40-1.70	0.60-2.00	0.07-0.21	16.0-22.0	5.1-7.3	Moderate	0.0-0.5	0.32		
	38-60	15-30	1.75-1.95	0.20-0.60	0.01-0.03	9.0-19.0	7.4-8.4	Low------	0.0-0.5	0.37		
622B2:												
Wyanet----------	0-6	12-22	1.30-1.45	0.60-2.00	0.20-0.24	11.0-21.0	5.6-7.3	Low------	2.0-4.0	0.32	5	5
	6-30	22-32	1.40-1.55	0.60-2.00	0.15-0.19	13.0-20.0	5.6-7.3	Moderate	0.0-0.5	0.32		
	30-60	10-20	1.70-1.90	0.20-0.60	0.05-0.10	6.0-13.0	7.4-8.4	Low------	0.0-0.5	0.37		
622C2:												
Wyanet----------	0-6	12-22	1.30-1.45	0.60-2.00	0.20-0.24	11.0-21.0	5.6-7.3	Low------	2.0-4.0	0.32	5	5
	6-32	22-32	1.40-1.55	0.60-2.00	0.15-0.19	13.0-20.0	5.6-7.3	Moderate	0.0-0.5	0.32		
	32-60	10-20	1.70-1.90	0.20-0.60	0.05-0.10	6.0-13.0	7.4-8.4	Low------	0.0-0.5	0.37		
809F:												
Orthents--------	0-3	15-27	1.70-1.90	0.20-0.60	0.08-0.14	10.0-18.0	3.5-5.5	Low------	0.5-1.0	0.32	3	8
	3-60	15-30	1.70-1.90	0.20-0.60	0.06-0.10	---	3.5-5.5	Low------	---	0.37		

Table 16.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Cation-exchange capacity	Soil reaction	Shrink-swell potential	Organic matter	Erosion factors		Wind erodibility group
										K	T	
	In	Pct	g/cc	In/hr	In/in	meq/100g	pH		Pct			
813F:												
Orthents	0-6	27-35	1.35-1.55	0.20-2.00	0.18-0.21	16.0-23.0	6.1-7.3	Moderate	0.0-1.0	0.32	2	7
	6-10	24-42	1.35-1.60	0.20-2.00	0.08-0.18	14.0-26.0	6.1-7.8	Moderate	0.0-0.5	0.43		
	10-60	---	---	0.00-0.20	---	---	---	Low	---	---		
Pits.												
823A:												
Schuline	0-9	27-35	1.30-1.60	0.60-2.00	0.18-0.21	17.0-25.0	5.6-8.4	Moderate	0.5-2.0	0.32	3	7
	9-16	18-35	1.60-1.80	0.06-0.20	0.08-0.12	11.0-22.0	7.4-8.4	Moderate	0.2-0.5	0.43		
	16-40	18-35	1.40-1.70	0.20-0.60	0.15-0.21	11.0-22.0	7.4-8.4	Moderate	0.2-0.5	0.43		
	40-60	20-45	1.60-1.90	0.06-0.60	0.08-0.18	12.0-28.0	7.4-8.4	Moderate	0.2-0.5	0.43		
823B:												
Schuline	0-7	27-35	1.30-1.60	0.60-2.00	0.18-0.21	17.0-25.0	5.6-8.4	Moderate	0.5-2.0	0.32	3	7
	7-37	18-35	1.60-1.80	0.06-0.20	0.08-0.12	11.0-22.0	7.4-8.4	Moderate	0.2-0.5	0.43		
	37-51	18-35	1.40-1.70	0.20-0.60	0.15-0.21	11.0-22.0	7.4-8.4	Moderate	0.2-0.5	0.43		
	51-60	---	---	0.00-0.06	---	---	---	Low	---	---		
3424A:												
Shoals	0-8	18-27	1.30-1.60	0.60-2.00	0.20-0.24	15.0-24.0	6.6-7.8	Low	2.0-4.0	0.32	5	6
	8-60	18-33	1.40-1.70	0.60-2.00	0.15-0.22	12.0-24.0	6.6-7.8	Moderate	0.5-2.0	0.32		
3450A:												
Brouillett	0-11	18-27	1.20-1.45	0.60-2.00	0.19-0.24	17.0-28.0	6.1-7.8	Low	3.0-6.0	0.32	5	5
	11-26	18-32	1.20-1.50	0.60-2.00	0.16-0.22	17.0-31.0	6.1-7.8	Low	3.0-6.0	0.32		
	26-42	18-32	1.20-1.55	0.60-2.00	0.15-0.20	13.0-27.0	6.1-8.4	Low	1.0-4.0	0.32		
	42-60	5-30	1.35-1.60	0.60-6.00	0.05-0.18	5.0-22.0	6.6-8.4	Low	1.0-2.0	0.32		
8431A:												
Genesee	0-7	10-20	1.35-1.55	0.60-2.00	0.14-0.18	7.0-16.0	6.1-7.8	Low	0.5-2.0	0.24	5	3
	7-46	18-27	1.30-1.50	0.60-2.00	0.17-0.22	12.0-18.0	6.1-8.4	Low	0.5-1.0	0.37		
	46-60	10-20	1.30-1.50	0.60-2.00	0.19-0.21	6.0-14.0	7.4-8.4	Low	0.2-1.0	0.37		
8665A:												
Stonelick	0-9	8-18	1.25-1.50	2.00-6.00	0.09-0.14	6.0-15.0	7.4-8.4	Low	0.5-2.0	0.24	5	3
	9-60	5-18	1.30-1.55	2.00-6.00	0.08-0.14	3.0-13.0	7.4-8.4	Low	0.3-1.0	0.24		

Table 17.—Soil and Water Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
5C2:												
Blair	C	None	---	---	1.0-2.0	Apparent	Jan-May	>60	---	High	High	High.
7D2:												
Atlas	D	None	---	---	0.5-1.5	Perched	Jan-May	>60	---	High	High	Moderate.
8F, 8G:												
Hickory	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
50A:												
Virden	B/D	None	---	---	+0.5-1.0	Apparent	Jan-May	>60	---	High	High	Moderate.
56B, 56B2:												
Dana	B	None	---	---	2.0-3.5	Perched	Feb-Apr	>60	---	High	Moderate	Moderate.
67A:												
Harpster	B/D	None	---	---	+0.5-1.0	Apparent	Jan-May	>60	---	High	High	Low.
69A:												
Milford	B/D	None	---	---	+0.5-1.0	Apparent	Jan-May	>60	---	High	High	Low.
104A:												
Virgil	B	None	---	---	0.5-2.0	Apparent	Jan-May	>60	---	High	High	Moderate.
112A:												
Cowden	D	None	---	---	0.0-1.0	Perched	Jan-May	>60	---	High	High	Moderate.
113A:												
Oconee	C	None	---	---	0.5-2.0	Perched	Jan-May	>60	---	High	High	High.
132A:												
Starks	C	None	---	---	0.5-2.0	Apparent	Jan-May	>60	---	High	High	Moderate.
134A, 134B, 134C2:												
Camden	B	None	---	---	>6.0	---	---	>60	---	High	Low	Moderate.
148A, 148B:												
Proctor	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	Moderate.
149A:												
Brenton	B	None	---	---	1.0-2.0	Apparent	Jan-May	>60	---	High	High	Moderate.

Table 17.—Soil and Water Features—Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
152A:												
Drummer	B/D	None	---	---	+0.5-1.0	Apparent	Jan-May	>60	---	High	High	Moderate.
153A:												
Pella	B/D	None	---	---	+0.5-1.0	Apparent	Jan-May	>60	---	High	High	Low.
154A:												
Flanagan	B	None	---	---	1.0-2.0	Apparent	Jan-May	>60	---	High	High	Moderate.
164A, 164B:												
Stoy	C	None	---	---	1.0-2.0	Perched	Jan-May	>60	---	High	High	High.
165A:												
Weir	D	None	---	---	0.0-1.0	Perched	Jan-May	>60	---	High	High	High.
171B:												
Catlin	B	None	---	---	2.0-3.5	Apparent	Feb-Apr	>60	---	High	High	Moderate.
198A:												
Elburn	B	None	---	---	1.0-2.0	Apparent	Jan-May	>60	---	High	High	Moderate.
199B:												
Plano	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	Low.
208A:												
Sexton	C/D	None	---	---	0.0-1.0	Perched	Jan-May	>60	---	High	High	Moderate.
214B:												
Hosmer	C	None	---	---	1.5-3.0	Perched	Feb-Apr	>60	---	High	Moderate	High.
219A:												
Millbrook	B	None	---	---	0.5-2.0	Apparent	Jan-May	>60	---	High	High	Moderate.
242A:												
Kendall	B	None	---	---	0.5-2.0	Apparent	Jan-May	>60	---	High	High	Moderate.
243B:												
St. Charles	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	Moderate.
291B:												
Xenia	B	None	---	---	1.5-3.0	Apparent	Feb-Apr	>60	---	High	High	Moderate.
322B, 322C2:												
Russell	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	Moderate.
330A:												
Peotone	B/D	None	---	---	+0.5-1.0	Apparent	Jan-May	>60	---	High	High	Moderate.

Table 17.—Soil and Water Features—Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
344B:												
Harvard	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	Moderate.
348B:												
Wingate	B	None	---	---	1.5-3.0	Apparent	Feb-Apr	>60	---	High	High	Moderate.
353A:												
Toronto	C	None	---	---	0.5-2.0	Perched	Jan-May	>60	---	High	High	High.
481A:												
Raub	C	None	---	---	1.0-2.0	Apparent	Jan-May	>60	---	High	High	Moderate.
496A:												
Fincastle	C	None	---	---	0.5-2.0	Perched	Jan-May	>60	---	High	High	Moderate.
551F, 551G:												
Gosport	C	None	---	---	1.5-3.0	Perched	Jan-Apr	20-40	Soft	Moderate	High	High.
570B2:												
Martinsville	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
618C2, 618C3, 618D2, 618D3, 618F, 618G:												
Senachwine	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
622B2, 622C2:												
Wyanet	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
809F:												
Orthents, loamy-	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	High.
813F:												
Orthents, silty-	B	None	---	---	>6.0	---	---	10-20	Soft	High	Moderate	Low.
Pits.												
823A:												
Schuline	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
823B:												
Schuline	B	None	---	---	>6.0	---	---	50-60	Soft	Moderate	Moderate	Low.
3424A:												
Shoals	C	Frequent	Brief	Nov-Jun	0.5-1.5	Apparent	Jan-May	>60	---	High	High	Low.
3450A:												
Brouillett	C	Frequent	Brief	Nov-Jun	1.0-2.0	Apparent	Jan-May	>60	---	Moderate	High	Low.

Table 17.—Soil and Water Features—Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
8431A:												
Genesee---------	B	Occasional	Brief-----	Nov-Jun	>6.0	---	---	>60	---	Moderate	Low------	Low.
8665A:												
Stonelick-------	B	Occasional	Very brief	Nov-Jun	>6.0	---	---	>60	---	Moderate	Low------	Low.

Table 18.—Engineering Index Test Data

(HO means horizon; MAX, maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; and UN, Unified)

Soil name	Sample number	Depth	HO	Moisture density		Percentage passing sieve--				LL	PI	Classification	
				MAX	OPT	No. 4	No. 10	No. 40	No. 200			AASHTO	UN
		In		Lb/ cu ft	Pct					Pct			
Dana silt loam---	90IL-045-049-1	0-11	Ap	104	18	100	100	98	93	33	12	A-6(11)	CL
	-4	17-27	Bt2	99	22	100	100	99	94	56	36	A-7-6(37)	CH
	-5	27-40	Bt3	112	16	97	96	92	78	32	18	A-6(12)	CL
	-7	51-70	2C	126	10	98	94	85	55	20	8	A-4(1)	ML-CL
Flanagan silt loam----------	90IL-045-046-1	0-7	Ap	104	19	100	100	97	90	33	11	A-6(10)	CL
	-6	30-45	Bt3	107	19	100	100	98	94	45	27	A-7-6(27)	CL
	-7	45-51	2Bt4	122	12	99	97	89	59	26	14	A-6(5)	CL
	-8	51-70	2C	127	11	95	91	87	74	21	7	A-4(3)	CL
Senachwine loam--	90IL-045-050-1	0-7	Ap	115	14	96	95	89	61	27	10	A-6(4)	CL
	-3	18-28	Bt2	119	13	98	97	90	57	26	14	A-6(5)	CL
	-5	33-60	C	129	12	98	95	88	61	20	5	A-4(1)	ML-CL
Xenia silt loam--	90IL-045-054-1	0-10	Ap	104	16	100	99	97	91	31	7	A-4(1)	ML
	-4	20-30	Bt2	106	20	100	100	100	97	43	25	A-7-6(26)	CL
	-5	30-40	2Bt3	116	14	100	99	96	76	30	14	A-6(9)	CL
	-7	48-70	2C	130	9	95	91	80	47	18	5	A-4(0)	SM-SC

Table 19.——Classification of the Soils

(An asterisk in the first column indicates that some or all of the map units of that series are taxadjuncts. See text for a description of those characteristics that are outside the range for the series)

Soil name	Family or higher taxonomic class
Atlas	Fine, smectitic, mesic Aeric Chromic Vertic Epiaqualfs
Blair	Fine-silty, mixed, mesic Aquic Hapludalfs
Brenton	Fine-silty, mixed, mesic Aquic Argiudolls
Brouillett	Fine-loamy, mixed, mesic Cumulic Hapludolls
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
Catlin	Fine-silty, mixed, mesic Oxyaquic Argiudolls
Cowden	Fine, smectitic, mesic Vertic Albaqualfs
Dana	Fine-silty, mixed, mesic Oxyaquic Argiudolls
Drummer	Fine-silty, mixed, mesic Typic Endoaquolls
Elburn	Fine-silty, mixed, mesic Aquic Argiudolls
Fincastle	Fine-silty, mixed, mesic Aeric Epiaqualfs
Flanagan	Fine, smectitic, mesic Aquertic Argiudolls
Genesee	Fine-loamy, mixed, mesic Fluventic Eutrudepts
Gosport	Fine, illitic, mesic Oxyaquic Dystrudepts
Harpster	Fine-silty, mesic Typic Calciaquolls
Harvard	Fine-silty, mixed, mesic Mollic Hapludalfs
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs
Hosmer	Fine-silty, mixed, mesic Oxyaquic Fragiudalfs
Kendall	Fine-silty, mixed, mesic Aeric Endoaqualfs
Martinsville	Fine-loamy, mixed, mesic Typic Hapludalfs
Milford	Fine, mixed, mesic Typic Endoaquolls
Millbrook	Fine-silty, mixed, mesic Udollic Endoaqualfs
Oconee	Fine, smectitic, mesic Udollic Epiaqualfs
Orthents, loamy	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
Orthents, silty	Fine-silty, mixed, nonacid, mesic Typic Udorthents
Pella	Fine-silty, mixed, mesic Typic Endoaquolls
Peotone	Fine, smectitic, mesic Cumulic Vertic Endoaquolls
Plano	Fine-silty, mixed, mesic Typic Argiudolls
Proctor	Fine-silty, mixed, mesic Typic Argiudolls
Raub	Fine-silty, mixed, mesic Aquic Argiudolls
Russell	Fine-silty, mixed, mesic Typic Hapludalfs
Schuline	Fine-loamy, mixed, calcareous, mesic Typic Udorthents
Senachwine	Fine-loamy, mixed, mesic Typic Hapludalfs
Sexton	Fine, smectitic, mesic Chromic Vertic Epiaqualfs
Shoals	Fine-loamy, mixed, nonacid, mesic Aeric Fluvaquents
St. Charles	Fine-silty, mixed, mesic Typic Hapludalfs
Starks	Fine-silty, mixed, mesic Aeric Endoaqualfs
Stonelick	Coarse-loamy, mixed, calcareous, mesic Typic Udifluvents
Stoy	Fine-silty, mixed, mesic Fragiaquic Hapludalfs
Toronto	Fine-silty, mixed, mesic Udollic Epiaqualfs
Virden	Fine, smectitic, mesic Vertic Argiaquolls
Virgil	Fine-silty, mixed, mesic Udollic Endoaqualfs
Weir	Fine, smectitic, mesic Chromic Vertic Epiaqualfs
Wingate	Fine-silty, mixed, mesic Oxyaquic Hapludalfs
*Wyanet	Fine-loamy, mixed, mesic Typic Argiudolls
Xenia	Fine-silty, mixed, mesic Aquic Hapludalfs

NRCS SOILS 37A
3/95

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

DESCRIPTION SYMBOL

CULTURAL FEATURES

BOUNDARIES

- National, state, or province
- County or parish
- Minor civil division
- Reservation, (national forest or park, state forest or park)
- Land grant
- Limit of soil survey (label) and/or denied access areas
- Field sheet matchline & neatline
- Previously published survey
- OTHER BOUNDARY (label)
- Airport, airfield (Davis airstrip)
- Cemetery (St Johns Cemetery)
- City / county Park (Central Park)
- STATE COORDINATE TICK
- LAND DIVISION CORNERS (section and land grants)
- GEOGRAPHIC COORDINATE TICK

TRANSPORTATION

- Divided roads
- Other roads
- # Trails

ROAD EMBLEMS & DESIGNATIONS

- Interstate (79, 79 345)
- Federal (410, 410 224)
- State (92, 92 347)
- County, farm, or ranch (376)
- RAILROAD
- POWER TRANSMISSION LINE (normally not shown)
- PIPELINE (normally not shown)
- FENCE (normally not shown)
- LEVEES
- Without road
- With road
- With railroad
- Single side slope (showing actual feature location)

DAMS

- Medium or small (W)

LANDFORM FEATURES

- Prominent Hill or Peak
- Soil Sample Site (S)

* Cultural features for use in Illinois

DESCRIPTION SYMBOL

CULTURAL FEATURES (cont.)

MISCELLANEOUS CULTURAL FEATURES

- Farmland, house (omit in urban areas)
- Church
- School
- Other Religion (label) (Mt Carmel)
- Located object (label) (Ranger Station)
- Tank (label) (Petroleum)
- Lookout Tower
- Oil and / or Natural Gas Wells
- Windmill
- Lighthouse

HYDROGRAPHIC FEATURES

STREAMS

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end

DRAINAGE AND IRRIGATION

- Double line canal (label) (CANAL)
- Perennial drainage and/or irrigation ditch
- Intermittent drainage and/or irrigation ditch

SMALL LAKES, PONDS, AND RESERVOIRS

- Perennial water
- Miscellaneous water
- Flood pool line (FLOOD POOL LINE)

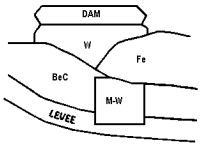
MISCELLANEOUS WATER FEATURES

- Spring
- Well, artesian
- Well, irrigation

DESCRIPTION SYMBOL

SPECIAL SYMBOLS FOR SOIL SURVEY AND SSURGO

SOIL DELINEATIONS AND SYMBOLS



LANDFORM FEATURES

- ESCARPMENTS
  - Bedrock
  - Other than bedrock
- SHORT STEEP SLOPE
- GULLY
- DEPRESSION, closed
- SINKHOLE

EXCAVATIONS

- PITS
  - Borrow pit
  - Gravel pit
  - Mine or quarry
- LANDFILL

MISCELLANEOUS SURFACE FEATURES

- Blowout
- Clay spot
- Gravelly spot
- Lava flow
- Marsh or swamp
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip
- Sodic spot
- Spoil area
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- Very stony spot
- Wet spot

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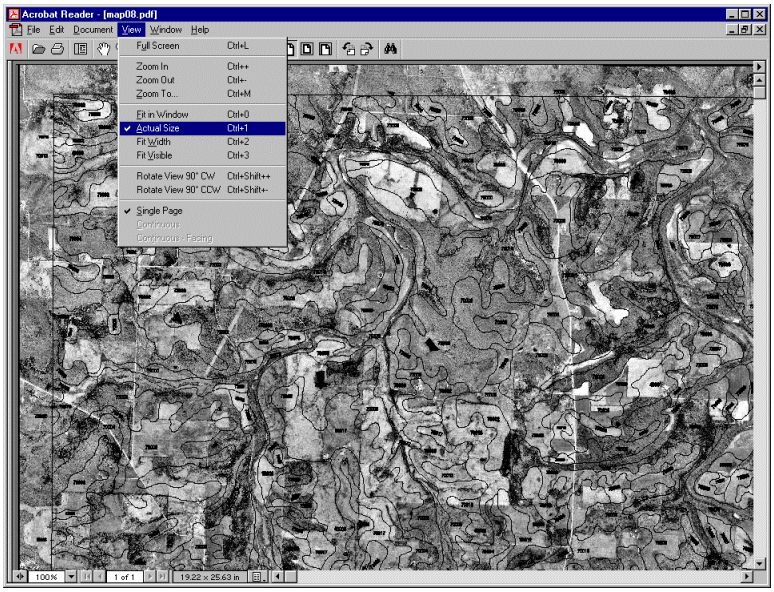
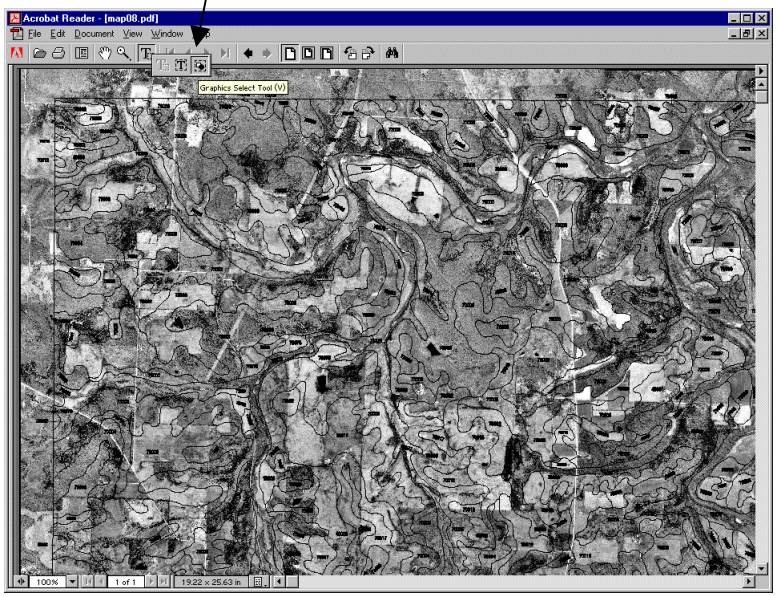
	SYMBOL_ID		SYMBOL_ID	
	1		23	
	2		24	
	3		25	
	4	Gray spot	26 GSP	
	5		27	
	6		28	
	7	Calcareous spot	29 CSP	
	8	Muck spot	30 MUC	
	9		31	
	10		32	
	11		33	
Dumps	12 DMP		34	
	13	Mine subsided Area	35 MSA	
	14		36	
Oil brine spot	15 OBS		37	
	16		38	
	17		39	
	18	Glacial Till spot	40 GLA	
	19		41	
Disturbed soil spot	20 DSS		42	
	21		43	
	22		44	

Printing Soil Survey Maps

The soil survey maps were made at a scale of 1:12000 and were designed to be used at that scale. To print the maps at 1:12000 scale, set the view to Actual Size from the View pull down menu.



Using the pan tool, go to the area you would like to print. Select the Graphic Selection Tool by holding down the Text Selection Tool button and clicking on the Graphic Selection Tool button.



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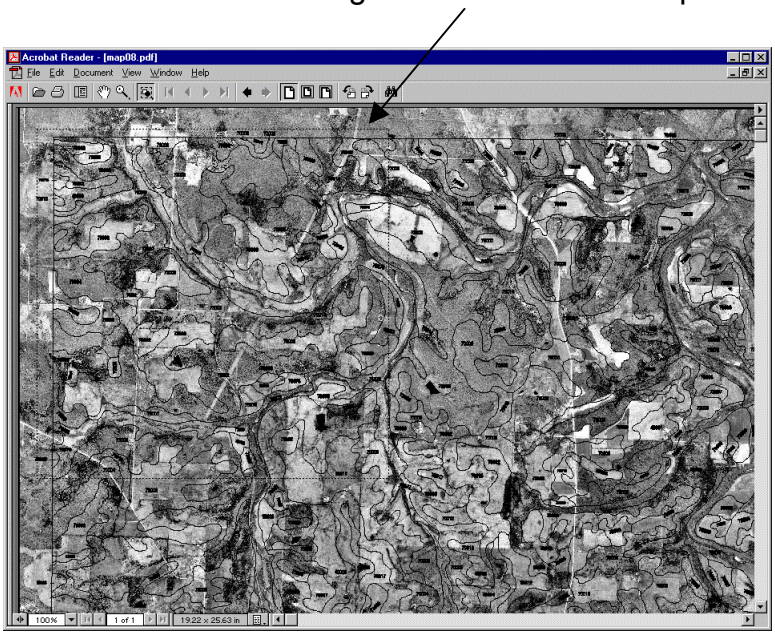

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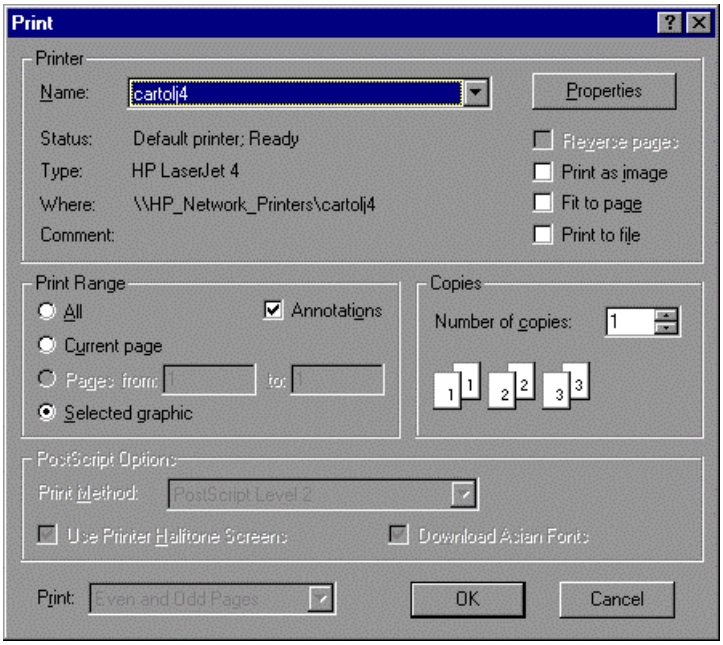

NRCS SOILS 37A
3/95

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NATURAL RESOURCES CONSERVATION SERVICE

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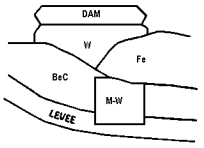

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	8	Muck spot	30 MUC	
	9		31	
	10		32	
	11		33	
Dumps	12 DMP		34	
	13	Mine subsided Area	35 MSA	
	14		36	
Oil brine spot	15 OBS		37	
	16		38	
	17		39	
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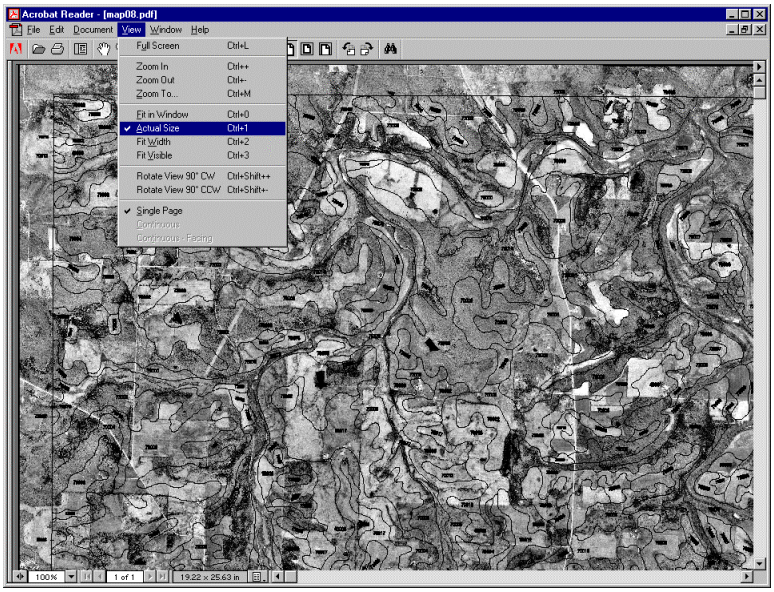

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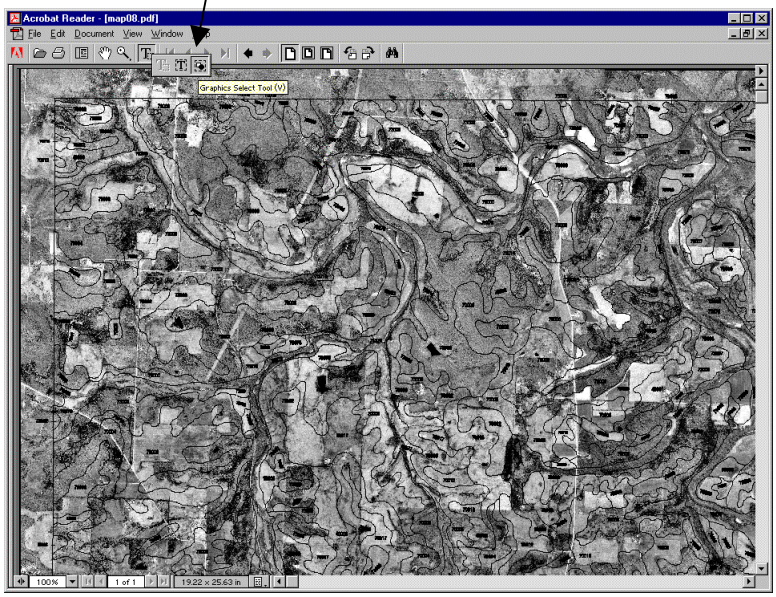

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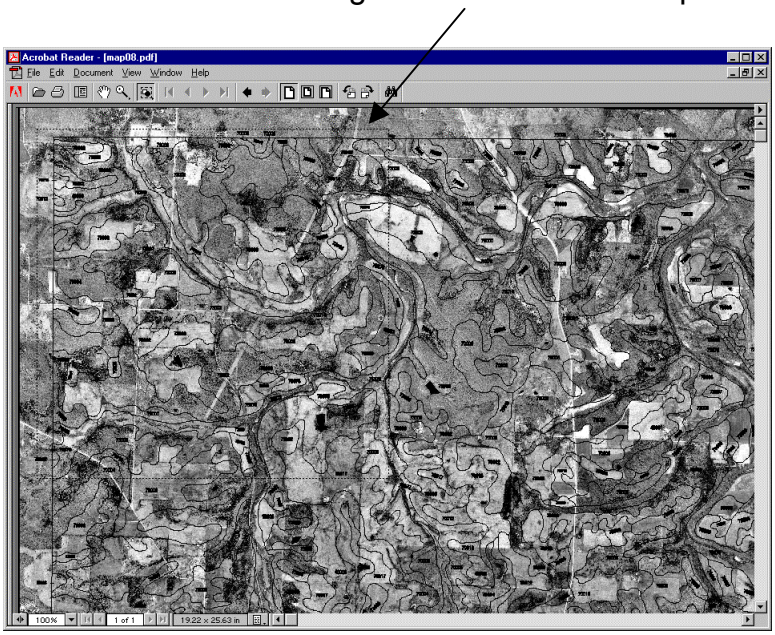

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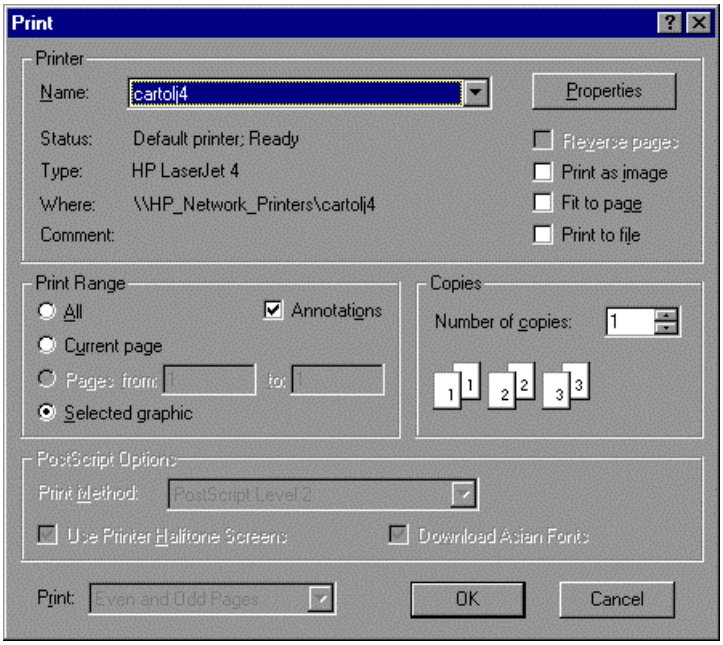

Descriptions of Special Features

Name	Description	Label
Blowout	A small saucer-, cup-, or trough-shaped hollow or depression formed by wind erosion on a preexisting sand deposit. Typically 0.2 acre to 2.0 acres.	BLO
Borrow pit	An open excavation from which soil and underlying material have been removed, usually for construction purposes. Typically 0.2 acre to 2.0 acres.	BPI
Calcareous spot	An area in which the soil contains carbonates in the surface layer. The surface layer of the named soils in the surrounding map unit is noncalcareous. Typically 0.5 acre to 2.0 acres.	CSP
Clay spot	A spot where the surface layer is silty clay or clay in areas where the surface layer of the soils in the surrounding map unit is sandy loam, loam, silt loam, or coarser. Typically 0.2 acre to 2.0 acres.	CLA
Depression, closed	A shallow, saucer-shaped area that is slightly lower on the landscape than the surrounding area and that does not have a natural outlet for surface drainage. Typically 0.2 acre to 2.0 acres.	DEP
Disturbed soil spot	An area in which the soil has been removed and materials redeposited as a result of human activity. Typically 0.25 acre to 2.0 acres.	DSS
Dumps	Areas of nonsoil material that support little or no vegetation. Typically 0.5 acre to 2.0 acres.	DMP
Escarpment, bedrock	A relatively continuous and steep slope or cliff, produced by erosion or faulting, that breaks the general continuity of more gently sloping land surfaces. Exposed material is hard or soft bedrock.	ESB
Escarpment, nonbedrock	A relatively continuous and steep slope or cliff, generally produced by erosion but in some places produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil.	ESO
Glacial till spot	An exposure of glacial till at the surface of the earth. Typically 0.25 acre to 2.0 acres.	GLA
Gravel pit	An open excavation from which soil and underlying material have been removed and used, without crushing, as a source of sand or gravel. Typically 0.2 acre to 2.0 acres.	GPI
Gravelly spot	A spot where the surface layer has more than 35 percent, by volume, rock fragments that are mostly less than 3 inches in diameter in an area that has less than 15 percent rock fragments. Typically 0.2 acre to 2.0 acres.	GRA

Name	Description	Label
Gray spot	A spot in which the surface layer is gray in areas where the subsurface layer of the named soils in the surrounding map unit are darker. Typically 0.25 acre to 2.0 acres.	GSP
Gully	A small channel with steep sides cut by running water through which water ordinarily runs only after a rain or after melting of snow or ice. It generally is an obstacle to wheeled vehicles and is too deep to be obliterated by ordinary tillage.	GUL
Iron bog	An accumulation of iron in the form of nodules, concretions, or soft masses on the surface or near the surface of soils. Typically 0.2 acre to 2.0 acres.	BFE
Landfill	An area of accumulated waste products of human habitation, either above or below natural ground level. Typically 0.2 acre to 2.0 acres.	LDF
Levee	An embankment that confines or controls water, especially one built along the banks of a river to prevent overflow onto lowlands.	LVS
Marsh or swamp	A water-saturated, very poorly drained area that is intermittently or permanently covered by water. Sedges, cattails, and rushes are the dominant vegetation in marshes, and trees or shrubs are the dominant vegetation in swamps. Typically 0.2 acre to 2.0 acres.	MAR
Mine or quarry	An open excavation from which soil and underlying material have been removed and in which bedrock is exposed. Also denotes surface openings to underground mines. Typically 0.2 acre to 2.0 acres.	MPI
Mine subsided area	An area that is lower than the soils in the surrounding map unit because of subsurface coal mining. Typically 0.25 acre to 3.0 acres.	MSA
Miscellaneous water	A small, constructed body of water that is used for industrial, sanitary, or mining applications and that contains water most of the year. Typically 0.2 acre to 2.0 acres.	MIS
Muck spot	An area that occurs within an area of poorly drained or very poorly drained soil and that has a histic epipedon or an organic surface layer. The symbol is used only in map units consisting of mineral soil. Typically 0.2 acre to 2.0 acres.	MUC
Oil brine spot	An area of soil that has been severely damaged by the accumulation of oil brine, with or without liquid oily wastes. The area is typically barren but may have a vegetative cover of salt-tolerant plants. Typically 0.2 acre to 2.0 acres.	OBS
Perennial water	A small, natural or constructed lake, pond, or pit that contains water most of the year. Typically 0.2 acre to 2.0 acres.	WAT

Name	Description	Label
Rock outcrop	An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock or where “Rock outcrop” is a named component of the map unit. Typically 0.2 acre to 2.0 acres.	ROC
Saline spot	An area where the surface layer has an electrical conductivity of 8 mmhos/cm-l more than the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has an electrical conductivity of 2 mmhos/cm-l or less. Typically 0.2 acre to 2.0 acres.	SAL
Sandy spot	A spot where the surface layer is loamy fine sand or coarser in areas where the surface layer of the named soils in the surrounding map unit is very fine sandy loam or finer. Typically 0.2 acre to 2.0 acres.	SAN
Severely eroded spot	An area where, on the average, 75 percent or more of the original surface layer has been lost because of accelerated erosion. Not used in map units in which “severely eroded,” “very severely eroded,” or “gullied” is part of the map unit name. Typically 0.2 acre to 2.0 acres.	ERO
Short steep slope	A narrow area of soil having slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.	SLP
Sinkhole	A closed depression formed either by solution of the surficial rock or by collapse of underlying caves. Typically 0.2 acre to 2.0 acres.	SNK
Slide or slip	A prominent landform scar or ridge caused by fairly recent mass movement or descent of earthy material resulting from failure of earth or rock under shear stress along one or several surfaces. Typically 0.2 acre to 2.0 acres.	SLI
Sodic spot	An area where the surface layer has a sodium adsorption ratio that is at least 10 more than that of the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has a sodium adsorption ratio of 5 or less. Typically 0.2 acre to 2.0 acres.	SOD
Spoil area	A pile of earthy materials, either smoothed or uneven, resulting from human activity. Typically 0.2 acre to 2.0 acres.	SPO
Stony spot	A spot where 0.01 to 0.1 percent of the surface cover is rock fragments that are more than 10 inches in diameter in areas where the surrounding soil has no surface stones. Typically 0.2 acre to 2.0 acres.	STN
Unclassified water	A small, natural or manmade lake, pond, or pit that contains water, of an unspecified nature, most of the year. Typically 0.2 acre to 2.0 acres.	UWT

Name	Description	Label
Very stony spot	A spot where 0.1 to 3.0 percent of the surface cover is rock fragments that are more than 10 inches in diameter in areas where the surface cover of the surrounding soil is less than 0.01 percent stones. Typically 0.2 acre to 2.0 acres.	STV
Wet depression	A shallow, concave area within an area of poorly drained or very poorly drained soils in which water is ponded for intermittent periods. The concave area is saturated for appreciably longer periods of time than the surrounding soil. Typically 0.2 acre to 2.0 acres.	WDP
Wet spot	A somewhat poorly drained to very poorly drained area that is at least two drainage classes wetter than the named soils in the surrounding map unit. Typically 0.2 acres to 2.0 acres.	WET